THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LIII. No. 1363.] LONDON, JUNE 25, 1889. [41ST YEAR. Price 6d.

WOLSTON'S Paste and Ready Mixed for Use.

Warranted Free from Adulteration. **TORBAY PAINTS.**

FOR GASHOLDERS, &c., &c.

The Original "Torbay Paints"

As supplied during many years to the LONDON GASLIGHT & COKE COMPANY.

TORBAY & DART PAINT Co., Ld.,
23, Gt. George St., Westminster, S.W.
DARTMOUTH, & BRIXHAM (TORBAY).

— ESTABLISHED 1830. —
PARKER & LESTER,
Manufacturers & Contractors.

THE ONLY MAKERS OF
PATENT ANTIMONY PAINT,
Parker's Imperial Black Varnish,
Oxide Paints, Oils, and General Stores for Gas and Water Works.

WORKS:
ORMSIDE STREET, OLD KENT ROAD,
LONDON.

Ashmore, Benson, Pease, & Co., Ld.,
STOCKTON-ON-TEES
Manufacturing Gas Engineers.
See Advertisement, p. 1191.

CEMENT
EARLE'S
BEST
PORTLAND CEMENT
MANUFACTURED BY
GEO. & THOS. EARLE,
HULL.
PROMPT DESPATCH:
Seven Jetties on the River.
Two Private Railway Sidings.
FACILITIES FOR DESPATCH:
Six Railway-Waggon Entrances with Steam and Hydraulic Cranes.
Four Rully Entrances.
Three different Railway Companies within easy cartage distance.
Storage Capacity 8000 tons.
Office: 7, PIER STREET.
Works: WILMINGTON.
ESTABLISHED 1811—OVER THREE QUARTERS OF A CENTURY.

"Abyssinian" Tube Wells.
Pure Water Supplies
LE GRAND & SUTCLIFF,
100, BUNHILL ROW,
LONDON.

MELDRUM BROTHERS
26, Half Street, Cathedral Yard, Manchester.

SIMPLEST AND MOST EFFICIENT APPARATUS FOR
BURNING BREEZE
In RETORT and BOILER FURNACES with best results.

STEAM JET GAS EXHAUSTERS.
REVIVIFYING BLOWERS. COMPRESSERS. LIQUID ELEVATORS.
SILENT BOILING JETS, Etc., Etc.

TELEGRAMS: "MELDRUM MANCHESTER."

DANIEL HOWARD,

(Successor to the late BENJ. WHITEHOUSE),

GASHOLDER AND BOILER WORKS,

WEST BROMWICH, NEAR BIRMINGHAM (Established 1765),

MANUFACTURER OF

TELESCOPIC AND SINGLE GASHOLDERS,

WROUGHT AND CAST IRON TANKS FOR DITTO,

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, AND ALL KINDS OF GAS APPARATUS,

WROUGHT-IRON ROOFS, BRIDGES, GIRDERS, ETC.,

STEAM, HOT WATER, AND RANGE BOILERS, TANKS, CISTERNS, BOATS,

AND ALL KINDS OF WROUGHT-IRON WORK.

Drawings, Specifications, and Estimates supplied on application.

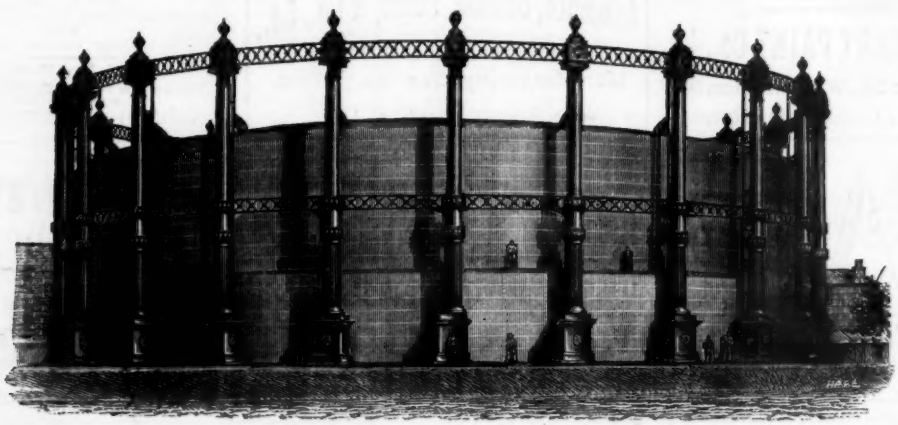
TELEGRAPHIC ADDRESS: "COCKEYS FROME."

EDWARD COCKEY & SONS, Ld.,

ESTABLISHED OVER HALF A CENTURY.

Gas Engineers, Ironfounders, & Contractors,

Manufacturers of GASHOLDERS and TANKS, BOILERS and ENGINES, ROOFS, EXHAUSTERS, BREEZE SCREENS, CHARGING and COKE BARROWS, PATENT WASHERS, PATENT VALVES for PURIFIERS, &c., GOVERNORS, LAMP COLUMNS, WEIGHBRIDGES, COKE-BREAKERS.



SOLE MAKERS OF COCKEY AND SMITH'S PATENT SELF-ACTING BYE-PASS VALVES.

Estimates for any description of Gas Plant on application.

THE IRON-WORKS, FROME SELWOOD, SOMERSET.

HIGHEST AWARDS—LONDON, PARIS, COLOGNE, VIENNA, MELBOURNE AND OTHERS.

—11 MEDALS.—

MANUFACTURERS OF TUBES AND FITTINGS OF EVERY DESCRIPTION.

WROUGHT-IRON OR STEEL MAINS UP TO 6 FEET DIAMETER, FOR GAS, WATER, OIL, OR OTHER PURPOSES.

SCREWING TACKLE, BOILER MOUNTINGS, VALVES, COCKS, ETC.

LONDON: 108, Southwark Street

BIRMINGHAM: 114, Colmore Row.

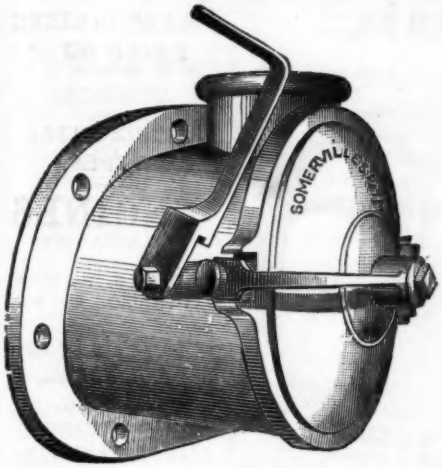
LEEDS: 6, Mark Lane, New Briggate.

THOMAS PIGGOTT & CO.,

(ESTABLISHED 1822)

SPRING HILL, BIRMINGHAM,

MANUFACTURERS OF



GASHOLDERS AND GAS APPARATUS,

INCLUDING

RETORTS AND FITTINGS, PURIFIERS, VALVES, PIPING SCRUBBERS, CONDENSERS, WASHERS, &c., &c., &c.;

GASHOLDER TANKS IN CAST AND WROUGHT IRON;

GOLIATH, HYDRAULIC, AND OTHER PURIFIER COVER LIFTS,

ALL OF THE MOST APPROVED DESIGNS.

BOILERS, ENGINES, PUMPS, EXHAUSTERS, METERS, GOVERNORS, &c.

SULPHATE OF AMMONIA PLANT.

MAKERS OF

SOMERVILLE'S PATENT RETORT MOUTHPIECES & LIDS,

WHICH ARE SELF-SEALING AND REQUIRE NO LUTING.

Prices and further Particulars may be obtained on application.

London Offices: 14, GREAT ST. THOMAS APOSTLE, E.C.—J. E. & S. SPENCER, Agents.

ESTABLISHED 1825.

GAS TUBES

MANUFACTURERS OF EVERY DESCRIPTION OF

IRON OR STEEL LAP-WELDED OR BUTT-WELDED TUBES

FOR ANY PURPOSE.

NEWTON, CHAMBERS, & CO., LIMITED,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD,

MANUFACTURERS OF

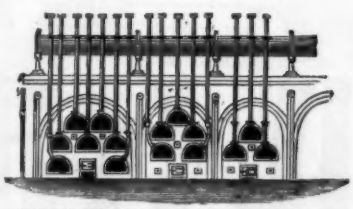
SLIDE VALVES,
With Rack & Pinion, or Internal or External SCREWS, of all Sizes.

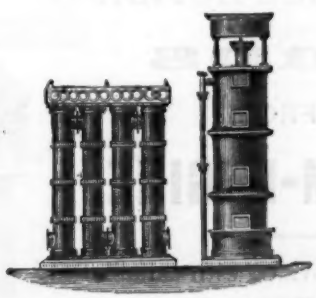
GASHOLDERS, AND **Gasholder Tanks.**

CAST-IRON RETORTS,
RETORT-BED FITTINGS,
AND RETORT-HOUSE APPLIANCES
of every description.
Iron Roofs, Columns, Girders, Floor Plates and Tools, &c.

WROUGHT AND CAST IRON
CONDENSERS, SCRUBBERS, & WASHERS
TAR AND LIQUOR PUMPS, &c.

PATENT
CENTRE VALVES
for working Purifiers.
Also Bye-Pass & Stop Valves.



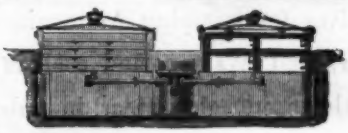


PURIFIERS with Planed Joints.

HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS and SPECIALS.

WOOD GRIDS.

CAST AND WROUGHT IRON TANKS AND CISTERNS.



DESIGNS, SPECIFICATIONS, AND ESTIMATES FREE.

Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

CROSSLEY'S "OTTO" GAS-ENGINE.

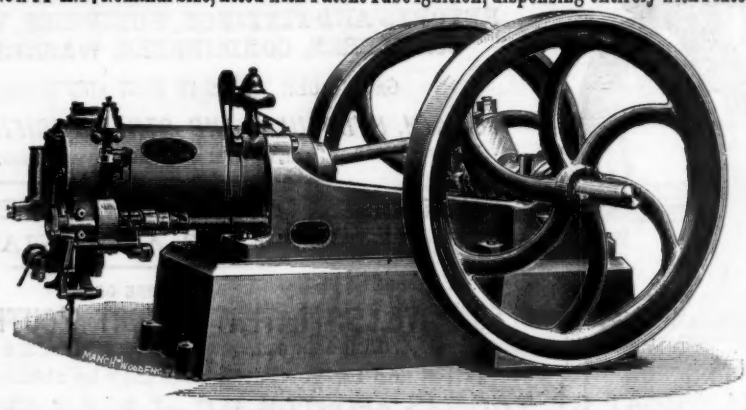
100 Prize Medals.

New 14-H.P. Nominal Size, fitted with Patent Tube Ignition, dispensing entirely with Plates.

MADE in SIZES 2-Man to 100-HP.

GAS-ENGINES COMBINED WITH PUMPS FOR TOWNS SUPPLY, SEWAGE, &c., &c.

GAS-ENGINES COMBINED WITH AIR COMPRESSORS FOR THE SHONE SEWAGE SYSTEM, LUCIGEN LIGHT, &c.



MADE in SIZES 2 Man to 100 HP.

VERTICAL AND HORIZONTAL TYPES.

ENGINES COMBINED WITH HOISTS, PUMPS, DYNAMOS, &c., &c.

Largely used for EXHAUSTING, PUMPING, COKE CRUSHING, ELECTRIC LIGHTING, &c., &c.

Over 31,000 "OTTO" ENGINES are at work.

CROSSLEY BROS., LTD., OPENSHAW, MANCHESTER,

LONDON, LIVERPOOL, GLASGOW, NEWCASTLE. BIRMINGHAM. HULL.

HARRIS & PEARSON,

STOURBRIDGE, ENGLAND.

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS, FIRE-BRICKS, LUMPS, & TILES of Every Description.

GLAZED BRICKS AND PORCELAIN BATHS.

R. & J. DEMPSTER,

ENGINEERS, IRONFOUNDERS, & CONTRACTORS,

GAS PLANT WORKS,

NEWTON HEATH, MANCHESTER.

BATTERY OF THREE DOUBLE-ACTION **Pumps** DRIVEN FROM **ONE STEAM-ENGINE.**

The Pumps are provided with suitable Valves for pumping Ammoniacal Liquor, Tar, and Water; and each is provided with Disengaging Gear, in order that any one can be stopped or started while the Engine is in motion.

WILLEY & CO.,

GAS ENGINEERING WORKS,

COMMERCIAL ROAD, EXETER.

Gas Department.

SPECIAL REFERENCE AND ATTENTION ARE INVITED TO OUR

WET AND DRY METERS,

Which have acquired a high reputation for the excellence of Materials and Workmanship. Their durability and accuracy of Register guaranteed.

They are used at the following Gas-Works :—**SOUTH METROPOLITAN, COMMERCIAL, LONDON, BRISTOL, BATH, PLYMOUTH, EXETER, SWANSEA, PENZANCE, DEVONPORT,** and numerous Foreign Towns and Ireland.

Station Meters of every capacity fitted with Overflow to ensure accuracy of Water Level. Station Governors. Self-Acting Adjustment to regulate Pressure accurately.

Street Lamp Meters with special Lamp-posts to receive same, or provided with separate Street Boxes.

Borradaile's Patent Lamp Governors adjusted to required Pressure and Consumption.

Street Lamp Pillars in variety of design.

Street Lamps, square and hexagon.

Cast-Iron Mains all sizes, Socket Joints turned and bored, Flanged Pipes and Specials for Connections to order. Wrought-Iron Service-Pipes (Gas, Steam, and Water quality), with fitting of same. Syphon Pumps for Stations. Syphon Pumps for Town Mains. Service Cleansers.

Pressure-Gauges for the Exhauster-Room, and various lengths to meet the whole requirements of Gas-Works.

Gas Chandeliers, Brackets, Pendants, Coronæ, and Fittings. Mediæval for Churches.

Special Elaborate Designs for large Public Buildings and Halls of Commerce.

A Choice Variety of Hall Lamps, Gas Globes, Shades, &c., to agree.

Carter's Valves, Main Cocks and Levers, Brass Cocks, Union Joints and Connections, with every description of small Gas-Fittings, Brass, Copper, and Composition Tubes.

Engineering Department.

Manufacturers of every description of **GAS APPARATUS, GASHOLDERS, TELESCOPE** and **SINGLE LIFT,** amongst which this Firm has erected the following :—

					Capacity.
PLYMOUTH GAS COMPANY	124	feet diameter,	56	feet deep,	Telescope 676,000
EXETER GAS COMPANY	117	„	50	„	„ 527,000
WINDSOR	90	„	36	„	„ 218,000
HEREFORD CORPORATION	82	„	60	„	„ 317,000
TORQUAY GAS COMPANY	82	„	40	„	„ 211,000
NEATH GAS-WORKS	88	„	22	„	Single-Lift 134,000
DEVONPORT GAS COMPANY	64	„	39	„	Telescope 125,000
EXMOUTH	60½	„	40	„	„ 107,886
BRENTWOOD	60	„	40	„	„ 106,312
ABERGAVENNY	70	„	20	„	Single-Lift 77,000
DARENTH ASYLUM					
METROPOLITAN BOARD OF WORKS (Two)	45	„	16	„	„ 25,000
BRECON GAS COMPANY	67	„	18	„	„ 63,000
TAUNTON GAS COMPANY	82	„	40	„	Telescope 211,000
FARNHAM, SURREY	70	„	20	„	Single-Lift 77,000

And other sizes at the following Gas-Works :—

NAAS.	PENZANCE.	ABERTILLERY (South Wales).	DAWLISH.	DARTMOUTH.
CREWKERNE.	GLASTONBRRY.		REDRUTH.	TRURO.
LISKEARD.	TOTNES.	HIGHBRIDGE.	IRONBRIDGE.	TAVISTOCK.
CHARD.	WIMBORNE.	LOUGHBOROUGH.	ST. COLOMB.	ILFRACOMBE.
MILFORD.	BUCKLEY.	BALBRIGGAN.	BLAENAVON.	LAUNCESTON.
BURNHAM.	MARYBOROUGH.	NAVAN.	FLETE.	HAYLE.

And numerous other Towns in the West of England and South Wales.

Plans and Specifications furnished for Extensions and Enlargement of existing Works, adapting them to the most Improved and Modern Principle of Gas Manufacture.

Purifiers, Condensers, Washers, Engines and Exhausters, Station Meters and Governors, Manufactured and Erected.

Makers, by permission of that eminent authority Mr. GEORGE LIVESEY, of his CELEBRATED PATENT WASHER, highly approved by all the Engineers of Works where adopted. Largely in demand.

Water Department.

All kinds of SANITARY BRASSWORK, comprising HIGH-PRESSURE VALVE-COCKS, BATH AND BASIN MOUNTING, STOP, BIB, AND BALL COCKS, FERRULES, UNIONS, CONNECTING JOINTS, BOILER UNIONS.

HUNT'S PATENT SUN-BURNER VENTILATING CEILING LIGHT.

This new Ventilating Ceiling-Light has been designed to meet a long-felt requirement—namely, greater economy and effectiveness, combined with the convenience and adaptability of the ordinary Sun-Burner. The combination of hexagonal reflectors by which it is formed, affords a very large reflecting surface, and their arrangement admits of the employment in a vertical position of the best known types of flat-flame burners; by which means an exceedingly brilliant, steady, and satisfactory lighting is secured. It can be supplied of any desired power, from a consumption of 50 or 60 cubic feet per hour to one of 1200 cubic feet per hour, and is suitable for lighting large Offices, Banks, Churches, Chapels, Theatres, and other Public Buildings. It is reasonable in its first cost, and economical in gas consumption in comparison with the light afforded.

Numerous References and Testimonials upon application with Prices.

WET & DRY GAS-METERS.

HUNT'S PATENT
COMPENSATING GAS-METER.

Station Meters & Governors.

OFFICIAL TEST-METERS.

Lamp Meters & Governors.

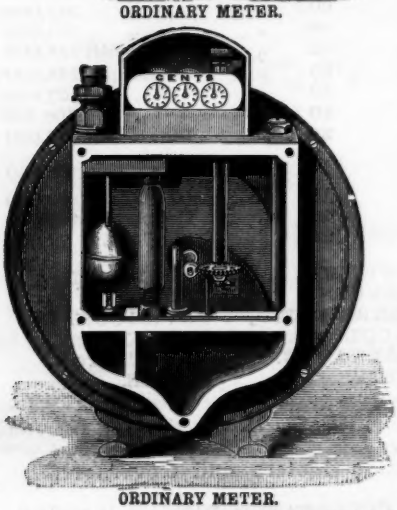
TEST HOLDERS.

PRESSURE-GAUGES.

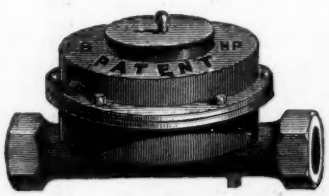
LAMPS & EVERY REQUISITE FOR PUBLIC LIGHTING.

ORDINARY METER.

DRY METER.



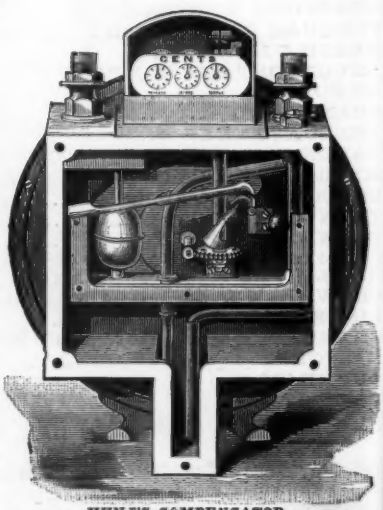
ORDINARY METER.



Bradbear's Improved Patent Gas-Engine Governor

Which effectually prevents Oscillation of Gas in Mains supplying Gas-Engines.

Prices and Testimonials on Application.



HUNT'S COMPENSATOR.

JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM.

Telegraphic Address: "GASMETERS, BIRMINGHAM." **ESTABLISHED 1830.**

KIRKHAM, HULETT, & CHANDLER, Ld.,

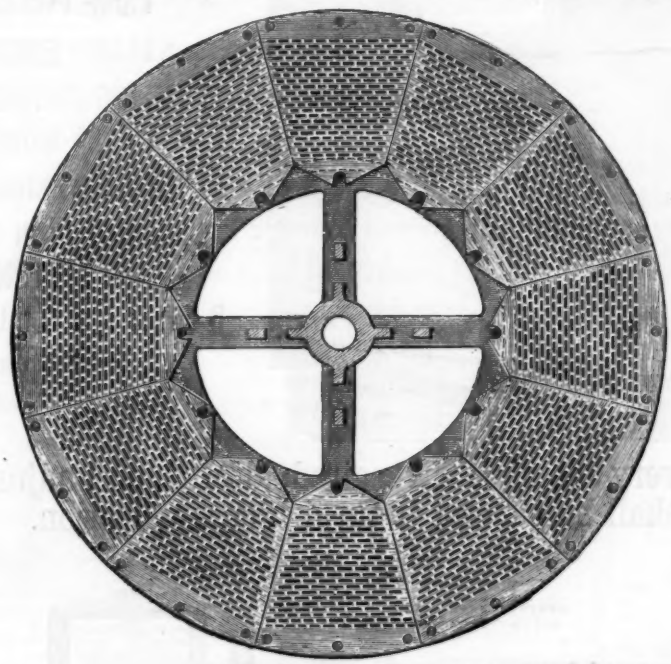
PALACE CHAMBERS,

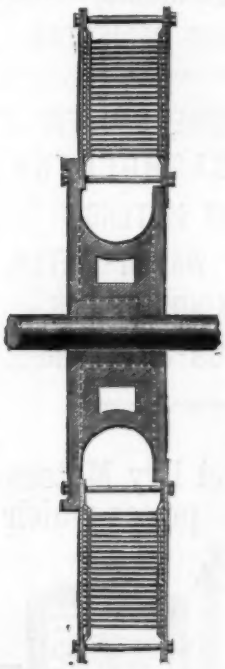
9, BRIDGE ST., WESTMINSTER.

Mr. S. HERSEY, Managing-Director.

THE "NEW" PATENT

"Standard" Washer-Scrubber





DETAILS OF WASHING DEVICES.

(**Thoroughly extracts every grain of Ammonia and a large quantity of other Impurities from Gas**)
Has been for many months in successful and satisfactory operation at **The Gaslight and Coke Company's Station at BECKTON,**

Resulting in a second order just received to fit up a Washer-Scrubber, of 2½ millions capacity, upon this new principle, at the same station. Other orders for these machines are in course of execution.

A very large amount of patronage has been accorded the "Standard" Washer-Scrubber, of which, up till now, **367** have been supplied, representing a daily make of **318,260,000** cubic feet of gas; but the advantages of the **"New Standard"** will be readily recognised, and its superiority over the present "Standard" may be briefly summarized as follows:—

1. The weight in motion is **only one-seventh** of that in the present machine.
2. It requires **only one-seventh** the power to drive; consequently effecting a large reduction in cost of Engine as well as in steam power.
3. **The Wear and Tear is enormously reduced,** as the Shaft has comparatively little weight to carry.
4. It has been found that the washing surfaces **keep perfectly clean** and free from deposit from end to end of the Machine.
5. It is so constructed that it forms a most powerful, effective, and complete system of purification, gives no pressure, and can be removed and replaced without trouble or injury.
6. The "New Standard," owing to the foregoing, can be supplied at **a large reduction in price.**

Engineers desirous of working Ammoniacal Liquor over and over again prior to leaving the "New Standard" can do so by the automatic and simple arrangement which forms part of this Patent.

The Apparatus can be applied to "Standard" Washer-Scrubbers already in use.

Particulars will be furnished upon application to the above address.

R. LAIDLAW & SON.

IMPROVED WET AND DRY GAS-METERS

IN CAST-IRON AND TIN CASES.

Two Gold Medals, One Silver Medal, One Bronze Medal, and Two Honourable Mentions,

INTERNATIONAL EXHIBITION, EDINBURGH, 1886.

MAKERS IN EDINBURGH OF

STATION METERS, ALL SIZES
GOVERNORS,
PRESSURE REGISTERS
(To Indicate New Time),
PRESSURE GAUGES,
TEST GASHOLDERS
TEST METERS,
SIEMENS' WATER-METER,
ALL KINDS OF GAS APPARATUS & FITTINGS.

MAKERS IN GLASGOW OF

CAST-IRON PIPES, ALL SIZES
LAMP PILLARS,
STEAM-ENGINES,
PUMPING ENGINES FOR WATER-WORKS,
BEALE'S GAS EXHAUSTERS,
WROUGHT-IRON TUBES AND FITTINGS,
BEAMS, COLUMNS, TANKS, &c.

Wet and Dry Meters of every description repaired, altered, and adjusted, at prices which we shall be pleased to furnish on application.

A LARGE STOCK OF METERS ALWAYS READY FOR IMMEDIATE DELIVERY OR SHIPMENT.

Descriptive Price Lists, Estimates, & full particulars forwarded on application.

ALLIANCE FOUNDRY, **GLASGOW.** | SIMON SQUARE WORKS, **EDINBURGH.** | 6, LITTLE BUSH LANE, **LONDON, E.C.**

TANGYES LIMITED,

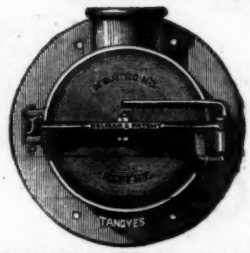
CORNWALL WORKS, BIRMINGHAM.

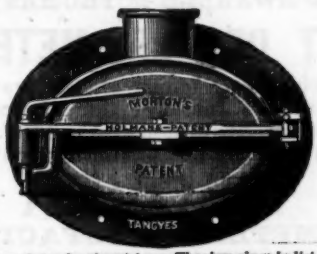
DEPÔTS AT

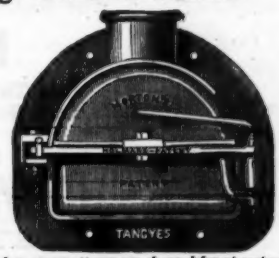
LONDON . . . . . 35, QUEEN VICTORIA ST., E.C.
NEWCASTLE-ON-TYNE ST. NICHOLAS BUILDINGS
MANCHESTER . . . . . DEANSGATE
GLASGOW . . . . . ARGYLE STREET

Sole Makers of **MORTON'S** Patent Self-Sealing **RETORT-LIDS,**

With Anti-Friction CATCHES, and Self-Sustaining CROSS-BARS.







Price of Mouthpieces depends on number required, which please state when inquiring. The sizes given in list we have patterns for; new patterns are charged for at cost price.

These Patent Retort Lids and Fastenings are in extensive use in most of the Gas-Works in Great Britain, America, and on the Continent, and have almost entirely displaced the older method of sealing by a luting of lime or other material. The Lids are made in three forms, D, oval, and round (as shown above), in each of which we have a very extensive variety of patterns, from which Gas Engineers contemplating the adoption of these lids are recommended to make their selection, in order to avoid cost of pattern making, delays, &c., &c.

Mouthpieces with Circular Lids for Oval Retorts.

Pattern No.	Diam. Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	PRICE, Lid and Fittings without Mouthpiece.
13658	14 ins.	14 × 12 ins.	15 ins.	£0 19 0
4356	14 ,,	18½ ,, 12 ,,	19½ ,,	0 19 0
6851	15 ,,	16 ,, 14 ,,	13 ,,	1 0 0
3629	15 ,,	18½ ,, 18½ ,,	14 ,,	1 0 0
3580	15 ,,	21 ,, 15 ,,	15 ,,	1 0 0
6264	16 ,,	18½ ,, 15½ ,,	15½ ,,	1 1 0
5210	16 ,,	20 ,, 14 ,,	15 ,,	1 1 0
6263	16 ,,	24 ,, 16 ,,	13½ ,,	1 1 0
5370	17 ,,	20 ,, 14 ,,	14 ,,	1 3 0
6832	17 ,,	20 ,, 14 ,,	17 ,,	1 3 0
6183	17 ,,	20 ,, 15 ,,	15 ,,	1 3 0
4289	17 ,,	21 ,, 15 ,,	14 ,,	1 3 0
5270	17 ,,	22 ,, 14 ,,	14 ,,	1 3 0
3631	18 ,,	18 ,, 14 ,,	20 ,,	1 5 0
3681	18 ,,	21 ,, 14 ,,	18½ or 15 ,,	1 5 0
3554	18 ,,	21 ,, 15 ,,	14½ ,,	1 5 0
7957	18 ,,	22 ,, 16 ,,	14 ,,	1 5 0
8048*	19 ,,	25½ ,, 15 ,,	18 ,,	1 8 6

Mouthpieces with Oval Lids for Oval Retorts.

Pattern No.	Dimensions of Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	PRICE, Lid and Fittings without Mouthpiece.
9800	18 × 14½ ins.	18 × 14½ ins.	15 ins.	£1 5 0
9205	20 ,, 12 ,,	24 ,, 14 ,,	10½ ,,	1 10 0
10000	20½ ,, 14½ ,,	20½ ,, 14½ ,,	15 ,,	1 10 0
9680	21 ,, 15 ,,	21 ,, 15 ,,	15 ,,	1 12 0
10056	21 ,, 14½ ,,	21 ,, 14½ ,,	15½ ,,	1 12 0
13218	21 ,, 15 ,,	21 ,, 15 ,,	17 ,,	1 12 0
10514	22½ ,, 18½ ,,	22½ ,, 18½ ,,	13½ ,,	1 13 0
13766	20 ,, 17 ,,	20 ,, 17 ,,	15½ ,,	1 15 0
13269	24 ,, 15 ,,	24 ,, 15 ,,	16 ,,	1 18 0

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Mouthpieces for Round Retorts.

Diam. .. .. ins.	14	15	16	17	18
Price, Lid and Fittings without Mouthpiece £	0 19 0	1 0 0	1 1 0	1 3 0	1 5 0

Mouthpieces with Circular Lids for D Retorts.

Pattern No.	Diam. Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	PRICE, Lid and Fittings without Mouthpiece.
5348	14 ins.	14 × 13 ins.	7 ins.	£0 19 0
3463	15 ,,	15 ,, 13 ,,	14 ,,	1 0 0
6678	15 ,,	15 ,, 14 ,,	12 ,,	1 0 0
3661	15½ ,,	15½ ,, 13 ,,	12 ,,	1 1 0
13052	16 ,,	16 ,, 13 ,,	13 ,,	1 1 0
5601	16 ,,	16 ,, 14 ,,	15 ,,	1 1 0
6827	16 ,,	16 ,, 14 ,,	17 ,,	1 1 0
4494	16 ,,	16 ,, 14 ,,	14 ,,	1 1 0
3548	16 ,,	16 ,, 15 ,,	12½ ,,	1 1 0
6677	16 ,,	16½ ,, 13½ ,,	12½ ,,	1 1 0
9645	16 ,,	16½ ,, 13½ ,,	12½ ,,	1 1 0
4434	16 ,,	17½ ,, 14 ,,	14 ,,	1 1 0
6469	16 ,,	18 ,, 14 ,,	15 ,,	1 1 0
9015	16 ,,	18 ,, 14 ,,	18½ ,,	1 1 0
4327	16 ,,	18 ,, 15 ,,	15½ ,,	1 1 0
8049*	16 ,,	18 ,, 15 ,,	17½ ,,	1 1 0
6137	16 ,,	20½ ,, 13½ ,,	18½ ,,	1 1 0
5918	17 ,,	18 ,, 14 ,,	14 or 17 ,,	1 3 0
5053	17 ,,	19½ ,, 12 ,,	14½ ,,	1 3 0
7548	17 ,,	20 ,, 13 ,,	15 ,,	1 3 0
6468	17 ,,	20 ,, 16 ,,	15½ ,,	1 3 0
4316B	17 ,,	21 ,, 14 ,,	14 ,,	1 3 0
7975	17 ,,	21 ,, 15 ,,	14½ ,,	1 3 0
19459	17 ,,	21½ ,, 13½ ,,	15 ,,	1 3 0
12990	18 ,,	18 ,, 15 ,,	15 or 19 ,,	1 5 0
7135	18 ,,	18½ ,, 15 ,,	13 ,,	1 5 0
10221	18 ,,	18 ,, 16 ,,	12½ ,,	1 5 0
4506	18 ,,	20 ,, 13 ,,	12½ ,,	1 5 0
6470	18 ,,	20 ,, 13 ,,	15 ,,	1 5 0
6818	18 ,,	20 ,, 13½ ,,	17½ ,,	1 5 0
4083	18 ,,	20 ,, 15 ,,	16 ,,	1 5 0
5306	18 ,,	20½ ,, 14 ,,	13½ ,,	1 5 0
13295	18 ,,	20½ ,, 14 ,,	19½ ,,	1 5 0
7356	18 ,,	20½ ,, 15½ ,,	18 ,,	1 5 0
4569	18 ,,	21 ,, 14 ,,	18 ,,	1 5 0
3628	18 ,,	21 ,, 15 ,,	16 ,,	1 5 0
7640	18 ,,	22 ,, 12½ ,,	18½ ,,	1 5 0
7971*	20 ,,	20 ,, 15 ,,	18 ,,	1 11 0

*Patterns marked * have Sockets at back to connect to Retorts; all the others are flanged. Patterns marked B have curved bottoms.* 191

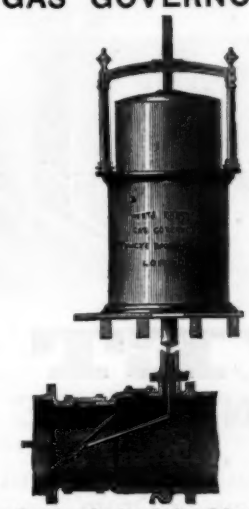
Mouthpieces with D Lids for D Retorts.

Pattern No.	Dimensions of Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	PRICE, Lid and Fittings without Mouthpiece.
12292	15½ × 13 ins.	15½ × 13 ins.	12 ins.	£1 2 0
9987	16 ,, 14 ,,	16 ,, 14 ,,	15½ ,,	1 3 0
13574	16½ ,, 18½ ,,	16½ ,, 18½ ,,	12½ ,,	1 4 0
9899	18 ,, 12 ,,	18 ,, 12 ,,	14 ,,	1 4 0
12980	18 ,, 16 ,,	18 ,, 16 ,,	18 ,,	1 6 0
13900	18 ,, 18½ ,,	18 ,, 13 ,,	15 ,,	1 6 0
9912	18 ,, 15½ ,,	18 ,, 19½ ,,	17 ,,	1 6 0
9962	18 ,, 15½ ,,	18 ,, 13½ ,,	16 ,,	1 6 0
10982	18 ,, 15½ ,,	18 ,, 14 ,,	15 ,,	1 6 0
11098	18 ,, 14 ,,	18 ,, 14 ,,	12 ,,	1 6 0
9492	20 ,, 18 ,,	20 ,, 13 ,,	15 ,,	1 10 0
9208	20 ,, 18 ,,	20 ,, 13 ,,	19½ ,,	1 10 0
10251	20 ,, 18 ,,	20 ,, 13 ,,	15½ ,,	1 10 0
12964	20 ,, 18 ,,	20 ,, 13 ,,	18½ ,,	1 10 0
9909	20 ,, 18½ ,,	20 ,, 18½ ,,	17 ,,	1 10 0
12969	19½ ,, 15½ ,,	19½ ,, 15½ ,,	14 ,,	1 11 0
13781	20 ,, 15 ,, Front. / 21 ,, 15 ,, Back.	21 ,, 15 ,,	15 ,,	1 11 0
7692	21 ,, 15½ ,,	21 ,, 15½ ,,	16 ,,	1 11 0
12978	20 ,, 16 ,,	20 ,, 16 ,,	17 ,,	1 11 0
13252	20 ,, 16 ,,	20 ,, 16 ,,	18 ,,	1 11 0
13220	21 ,, 15 ,,	21 ,, 15 ,,	17 ,,	1 11 0
8977	21½ ,, 18½ ,,	21½ ,, 13½ ,,	18½ ,,	1 11 0
8976	21½ ,, 18½ ,,	21½ ,, 18½ ,,	18½ ,,	1 12 0
10497	21½ ,, 18½ ,,	21 ,, 15½ ,,	18½ ,,	1 12 0
8037	21½ ,, 18½ ,,	21½ ,, 18½ ,,	18½ ,,	1 12 0
9908	21½ ,, 18½ ,,	21½ ,, 18½ ,,	15 ,,	1 12 0
10404	21½ ,, 18½ ,,	22 ,, 14 ,,	18½ ,,	1 12 0
12410	21½ ,, 18½ ,,	22 ,, 14 ,,	12 ,,	1 12 0
13822	21½ ,, 18½ ,,	22 ,, 14 ,,	15 ,,	1 12 0
10515	22½ ,, 12½ ,,	22½ ,, 12½ ,,	13½ ,,	1 12 0
7924	24 ,, 14 ,,	24 ,, 14 ,,	15½ ,,	1 13 0
13807	24 ,, 15½ ,,	24 ,, 15½ ,,	16 ,,	1 14 0
9015B	25 ,, 14 ,,	25 ,, 14 ,,	12½ ,,	1 14 0
10932	25 ,, 14 ,,	24 ,, 14 ,,	13½ ,,	1 15 0
12944B	22 ,, 16 ,,	22 ,, 16 ,,	16 ,,	1 15 0

Patterns marked B have curved bottoms. 192

HUNT'S PATENT EQUILIBRIUM DIRECT MAIN

GAS GOVERNOR.



In this Governor a throttle valve is substituted for the ordinary suspended cone; all external communication being avoided by placing the lever or radius arm inside the valve chamber upon the disc.

The disc is carried upon steel centres, upon which it is accurately balanced.

4 ins. ...	£17 0	8 ins. ...	£25 0	14 ins. ...	£42 0	20 ins. ...	£60 0
5 ,, ..	20 0	10 ,, ..	33 0	16 ,, ..	46 0	24 ,, ..	72 0
6 ,, ..	22 10	12 ,, ..	38 0	18 ,, ..	50 0	36 ,, ..	130 0

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London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. The SIX MEDALS AWARDED to THOMAS GLOVER for Paris, 1867.

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.
Since then we have not Exhibited for Prizes.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 to 222, ST. JOHN ST., CLERKENWELL GREEN, LONDON, E.C.

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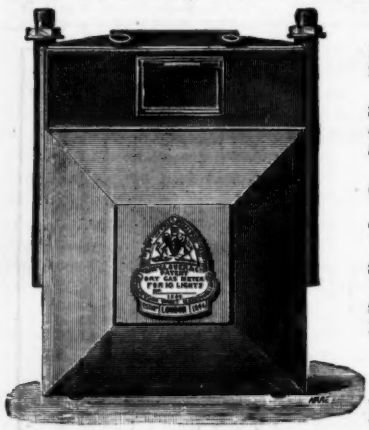

1st—Are a remedy for all the defects of Wet Meters
2nd—Are suitable for all climates, whether hot or cold.
3rd—Incur no loss of Gas by Evaporation.
4th—Cannot become fixed by frost, however severe.
5th—Are the most accurate & unvarying measurers of Gas.
6th—Prevent jumping or unexpected extinction of the Lights.
7th—May be fixed either above or below the level of the Lights.
8th—Cannot be tampered with without visibly damaging the outer case.
9th—Will last much longer than Wet Meters.
10th—Will not cost more than one-half for repair that Wet or Water Meters do.
Are upheld for five years without charge.

Meters fitted with Grey's Index or Harding's Counter.

W. PARKINSON & Co.

WET METERS

IN TINPLATE OR CAST-IRON CASES

COMBINE THE FOLLOWING IMPORTANT IMPROVEMENTS:—

Parkinson's Patent Three-Partition Measuring Drum { *Ensures perfect accuracy of measurement with the least possible friction, works with the greatest ease, and is free from complication of any kind.*

Slow-Spoon Compensator { *Maintains an unvarying Water-line without any appreciable friction, and provides a large reserve of Water. Has stood the test of Time.*

Enclosed Float { *Allows sudden or excessive pressure on the Inlet without affecting the working of the Meter, or extinguishing the Lights.*

COTTAGE LANE WORKS, CITY ROAD, LONDON. *Telegraphic Address:* 'INDEX LONDON."

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

TO ADVERTISERS.

ADVERTISEMENTS for the next number of the JOURNAL must be received by Monday, 12 o'clock noon, to ensure insertion; but as the Advertisement sheet of the JOURNAL is sent to Press the first thing on Monday Morning, Advertisers will please bear in mind that Orders for Alterations in or Stoppages of PERMANENT Advertisements should be received Not Later than Two o'clock on SATURDAYS.

Telegraphic Address: "GASKING LONDON."

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 25, 1889.

THE MEETING OF THE GAS INSTITUTE.

THE long looked-for meeting of The Gas Institute has taken place; and we are able to report to readers of the JOURNAL who were unable to attend, and who happen to be interested in the fortunes of the organization, how matters went on this specially portentous occasion in its history. It cannot be gainsaid that many of the best friends of the Institute trembled inwardly over the prospects of the meeting; while those who no longer believed in it thought there was more than a probability that this gathering would be the last of its kind. We are free to record the fact that the meeting passed off wonderfully well, and appeared to warrant the expectation that the Institute will survive its present troubles, and endure for any number of years to come. The attendance was good—not up to the average of a London meeting of late years, but at least equalling an ordinarily successful country gathering. It comprised many members who could not be described as sympathizers with the policy of the Council in all respects; but, on the other hand, there were very few present who did not hold that the Institute is worth preserving, and that nothing in its past troubles warrants the opinion that its condition is beyond remedying, without resorting to the extreme measure of dissolution. It is too notorious to need mentioning how we have disagreed with much—indeed, with most—that has been done by the handful of the Council who have dragged the organization along to the date of the opening of the meeting. We have maintained that they have committed numerous blunders, and have acted in an arbitrary manner upon many occasions. We do not shrink from one of the positions which we have taken up in the past with regard to the affairs of The Gas Institute; but at the same time we freely admit that the Council have worked hard upon their own lines, and that they have been vindicated by the voice of the members who have just met to receive the account of their stewardship. It is certain that readers of the JOURNAL expect an expression of opinion in its pages regarding current events; and we have never shrunk from placing opinions on record in the clearest language at our command. Nobody can ever accuse us of trying to "run "with the hare and hunt with the hounds;" but again, it is not our duty to avoid recognizing facts when they come before us. The Gas Institute in general meeting assembled has condoned the acts of the members of Council who took up the government of the society when the majority of the elected rulers laid it down; and we have not the slightest intention of finding fault with them for so doing. The Institute exists for its members; and if they deliberately follow a certain policy, it would be sheer pedantry for us to sacrifice what influence for good belongs to an observer with facilities for expressing an honest opinion, in the vain endeavour to prove that we know better than the members themselves what is good for them.

It may be asked who were the members that voted in favour of the Council last week; but it would be an invidious thing to weigh the judgment of A., B., and C. who were present, against that of X., Y., and Z. who stayed away. Suffice it to say that it was The Gas Institute; and seeing that voting is merely a matter of counting hands, numbers are everything. The numbers that upheld Mr. Garnett and his colleagues last week were equal to others who have decided questions of Gas Institute policy in times past; and we must decline to attempt a qualitative analysis of the voters. There is no harm, however, in stating that while there were many good men present, it would have been easy to compile a list of absentees that would be regarded anywhere as fairly representative of the British gas industry. It would not be right, moreover, to take any particular man, whether present or absent, as necessarily signifying by this circumstance his views respecting the business before the meeting. The Council, when they looked across the table at the commencement of the proceedings, saw before them many members of whose opinions they were necessarily ignorant; and if those whom they might have regarded as their strongest opponents were absent, the same might be remarked of many whom they could have depended upon as decidedly friendly.

The business portion of the *agenda* contained matter likely to arouse bitter hostility, and even perchance litigation, and the technical fare provided was extremely poor and thin. Yet the meeting, as a whole, was a conspicuous success, to the surprise of everybody concerned. The credit for this result is due to two or three men, chief among whom must be named the President, Mr. George Garnett, the legal adviser of the Council, Mr. Radcliffe, and Mr. Thomas Duxbury, who now stands revealed as the working spirit of the Council. Upon Mr. Valon's shoulders rested the burden of redeeming the credit of the Institute as a means for disseminating new and useful technical information; and to Mr. Hepworth belongs the praise that attaches to the peacemaker. Mr. Garnett was, as the event proved,

almost an ideal President for such an occasion. His age ensured respect from an assembly which scarcely contained a contemporary; his joviality was infectious; and his experience as a town's politician and man of affairs gave him assurance in the discharge of the duties of the chair. He has lived too retired a life to make any enemies like those who attack the heels of the successful ones who march at the head of their profession; while at the same time he is known far and near as one of the kindest-hearted of men. He succeeded where a more severe or dignified gentleman might easily have failed. As to Mr. Radcliffe, the able lawyer of the Institution of Civil Engineers, he was as efficient as the unfortunate selection of last year for the same duty was unsatisfactory—which is saying a good deal. It was impossible to "assist," as the French say, at last Tuesday's business without feeling both sorrow and anger at the contrast between the way in which matters were done then and the muddle of a year ago. Not but what there was a great deal of good luck as well as good management about last week's performance. A little more irritation on the part of the Council, betrayed in a very little additional rigidity in carrying on the meeting, and the whole business would have been plunged into hopeless confusion. As it happened, Mr. Duxbury was superior to taunts; and the President was deaf to plausible obstructiveness.

What, then, remains for the Institute to do, now that it has been once more equipped with a full staff of officers, and the worst of the weak places stopped? Mainly this—to prove itself worthy of the additional length of days that fate and circumstances have accorded to it. We do not say anything at present concerning the vexed question of traders in its ranks. There were plenty of these in evidence last week, note-book in hand, pouncing upon every opportunity for waylaying unwary gas managers, and, in the usual fashion, utilizing the meeting for turning a penny. The pity of it is that gentlemen like Mr. D. Bruce Peebles, who are acquisitions to any Association, should be available as a screen behind which "touters" and "tippers" can carry on their seductions. This is a matter that must be recommended to the earnest attention of the new Council. Then there is the question of papers. At the present time the balance of quality in technical contributions is on the side of the District Associations, as compared with the Institute. If this state of things continues, the Institute will lose its reason for existence, and waste to death. Poverty has been pardoned this year on account of circumstances; but if improvement is not shown a twelvemonth hence, this last respite will have been fruitless.

THE NEW MOVEMENT.

The history of the past week in regard to gas affairs would not be complete without a notice of the meeting of Mr. A. Colson's Provisional Committee last Saturday, a report of which will be found elsewhere. The previous meeting was adjourned in order that it might be seen what The Gas Institute proposed to do by way of removing the obstacles felt by the majority of the seceders to be standing in the way of their return to that Association. At Saturday's meeting the slight difficulty arose that nobody identified with the new movement had attended the Institute meetings for the particular purpose of reporting what had taken place, or, more important still, of ascertaining the views of the majority of members of the Institute respecting the necessity for reform. This deficiency was partly made up by Mr. Eastwood, who volunteered an account of the doings of the week at the Institution of Civil Engineers. But this statement was incomplete in many respects, as was only to be expected of a story told on the spur of the moment; and consequently those who attended the meeting had for the most part to act upon the promptings of their own inner consciousness, or on what they had gleaned from private conversations with friends. Hence the proceedings read rather "ragged," as though the meeting had no defined plan—which was indeed the case. The result, however, was all that could have been desired. Without yielding the principle upon which their companionship has been erected, the gentlemen who gathered round Mr. Foulis on Saturday afternoon took cognizance of the fact that the most prominent feature of the Institute proceedings was the manifestation of a desire for reunion; and they unanimously refrained from taking any step which could be made to appear like despising the overtures of their old associates. The sentiments expressed within the Institute by Mr. Hepworth were accepted on Saturday as a reason for not going on for the present with the formation of a separate organization, although it was recognized that, in point of fact, nothing had been done by the Institute to meet the views of the promoters of the new movement, except the choice of a new governing body containing men who, like Mr. Hepworth and Mr. Valon, are notoriously in sympathy with their object, while hopeful of accomplishing it within instead of outside the Institute. This is a great deal, however; and so the party of reform outside are content for the time to give the new Council of the Institute an opportunity for trying what they can do by way of repairing the breach, before they for their part do anything to make it wider. There is no need for hurry, since the position of the new party will be just as strong six months or a year hence as it is to-day, supposing that the Council of the Institute do nothing; and if, on the other hand, something is done from within the Institute which they can accept even as an earnest of a better understanding, it will be preferable for it to be done in union than in rivalry.

Lest there should be any additional misrepresentation of the circumstances, it has been decided to make public Saturday's proceedings; and it will be a gain to the cause of lucidity if we give the following statement, as a gloss upon the bare record, which may be trusted as conveying the sense of the majority present: The desire for reunion, expressed by Mr. Garnett and others in authority in The Gas Institute is heartily reciprocated; but, while not seeking to dictate or impose terms, the seceders firmly hold that there is no present opening for their return to the old Association. They comprise within their ranks men who have left the Institute for different reasons, and men who never belonged to it. They have a considerable number of sympathizers within the Institute, who will eventually leave it if a sufficient measure of reform is not carried. Whatever their individual differences of opinion, however, there is one proposition upon which they are agreed, and which may be distinguished as the touchstone of their principles. It is that neither The Gas Institute nor any other organization embodying representatives of the gas industry can be respected while it is degraded by the accompaniment of trade touting and treating at its meetings. Much unnecessary feeling has been imported into the discussion of this question by the use of too sweeping language. A man is not necessarily objectionable because he happens to be in trade; but there are many who *are* objectionable on this account, or rather on account of their way of doing business. Mr. D. Bruce Peebles took part in The Gas Institute proceedings; and hence there can be no impropriety in referring to him as an example of an engineer whose presence is always welcome among men who are not the less his friends because he transacts business with them at other times. Is it satisfactory to anybody whose opinions are worthy of respect, however, for the meetings of an ostensibly professional society to be beset by persons who only attend them for the purpose of hawking the commodities which they have to sell, who never contribute to the technical value of its proceedings, and only by their numbers make its excursions unwieldy? These satellites care nothing for the honour of the society on which they prey. They usurp the best rooms at hotels, and jeer at the technical and business proceedings. Formal union with the Institute was regarded as promising the possibility of establishing some sort of check upon these gentry; but the hope has proved fallacious. Let the best men in the Institute recognize this evil, and the necessity for curing it, and it will be found that the difference between them and the leaders of the new movement in other respects will sink into utter insignificance.

ANOTHER NEWSPAPER ERROR.

It is a desperate task to correct the daily press in respect of the reports spread regarding the competition of gas and electric lighting in different parts of the world. Recently we had occasion to "pull up" a writer in the *Daily Telegraph*, and convict him of spreading false news relating to the advance of electric lighting, and the consequent depression in gas, in the French provinces. This time it is the usually more reliable *Standard* that has gone wrong, in the course of a leading article upon the subject of the recent invasion of England by American engineers. Among other interesting objects of the country which the writer of this effusion named as waiting the notice of these visitors, was included the programme for lighting London by electricity supplied from central stations; and he said, with the customary dogmatism of the leader writer, that they would find us just preparing to introduce the electric light while "every town and village in the United States and

"Canada is abandoning gas." The moral of this story being, of course, that, in matters of town lighting, Great Britain is very much behind the American continent. General readers who do not know better are liable to be impressed by these mouth-filling generalities, particularly as the specialists who could show their baselessness are not allowed an opportunity for doing so. If a gas engineer were to write to a daily paper found guilty of repeating a misstatement of this kind, and were to show by statistics that, so far from electricity driving out gas, it is the Gas Companies who in many places in America have been induced to buy up bankrupt electric lighting concerns and keep up the service for the accommodation of their customers and shareholders, and that the annual increase in the sale of gas throughout the States has been greatly swollen by the taste for more light fostered by electricians, it is very doubtful if he would be granted due space and prominence for his purpose. This is notoriously one of the drawbacks of the modern newspaper—that it always has a start with any misrepresentation to which its conductors choose to give currency, and seldom submits to correction. These unfounded statements respecting the defeat of gas in foreign parts are likely to arrest the attention of gas proprietors, and to suggest questions to gas-works directors and officials by nervous shareholders, who may so far believe the newspapers as to credit the monstrous idea that the wave of progress in electric lighting has hitherto been kept back in the United Kingdom by some mysterious agency, only to overwhelm the country all the more quickly some day in the near future. To all such inquirers it is perfectly safe to recommend, in the general way, a healthy scepticism regarding all the electric lighting news that may be gathered from the papers. It is not that the newspapers have entered into any definite conspiracy with electricians to distort facts, but newspaper writers naturally run after anything that wears the garb of novelty; and they have in nearly every case imbibed the notion that the electric light is essentially a more "scientific," and therefore more desirable luminant than gas. The less they individually know about a matter of this kind, the more easily are they induced to patronize the side that pretends to innovate, and to hold that change necessarily means improvement. Every editor of a little country newspaper immediately rushes with outstretched columns to welcome the electric light speculator when he comes into the town promising to turn night into day. The wonderful electric light is to be exhibited in Little Peddlington, which is in this respect at least to show a bright example of "progress" to the rest of the country! To do him justice, however, the local editor soon finds out the weakness of the new light; and the newspapers published in towns of the United Kingdom where electricians have come to grief, are among the most candid witnesses to the folly of the men who in matters of lighting promise more than they can perform. Consequently, we do not desire a better friend of gas-lighting than the newspaper man who has seen the electric light at work; while the same man is likely to be the worst of illusionists when he has no local knowledge, and only speaks of what he has learnt at second-hand with reference to the progress of electric lighting in distant places.

SUMMER FOGS.

The subject of fogs has been taken under the consideration of the London County Council; and although we are not very hopeful of any practical outcome of their deliberations upon the subject, it is certain that they might spend time to less advantage than in the examination of the causes and effects of what is really one of the most salient features of London life. We should not have mentioned the well-worn topic again at this time, but for the remarkably prominent part played by summer fogs in the meteorology of the present year. Time was when Londoners expected fog in November, and at reasonably frequent intervals until March, as constituting a feature of the London winter. They did not like this particular variety of weather, but were prepared for it and even took a characteristic pride in living through perhaps the vilest kind of atmospheric infliction experienced by civilized man. Of late years, however, there has been a decided increase of summer fogs—a bad sample of which afflicted London at midday of Saturday, the 15th inst., when for an hour or two those who were compelled by their avocations to remain in town beyond the hour of the commencement of the usual half-holiday were compelled to light the gas in their offices, and grope their way about corridors just as they are accustomed to do too often in winter. This summer fog is an interesting study for the meterologist; for it is evident that some of the accepted reasons for the peculiar permanence and virulence of the winter fogs in the Thames Valley are not available as an explanation of these warm-weather fogs. Is the climate of London growing worse instead of better in this respect, or how can we account, with any tolerable approach to probability, for the obscurations of the light of the summer sky which are experienced more frequently as year succeeds year? Whatever may be the explanation, the fact remains, and it is not by any means a pleasant thing to recognize that as London grows bigger every year, so it becomes more objectionable in respect of weather.

The annual *conversazione* of the Society of Arts is fixed to take place at the South Kensington Museum on Friday next.

The position of Manager of the Worksop Gas Company, recently advertised in our columns, has been filled by the appointment of Mr. Kent, of the Boston (Lincs.) Gas-Works.

Mr. A. C. Fraser, late Engineer of the Bolton Corporation Gas Department, has received an appointment as Manager to Messrs. Jonas Drake and Son, gas engineers and contractors, of Halifax.

The American Engineers who have been lately staying in the Metropolis left last Thursday morning for Paris, where, among other public works, they will inspect the sewerage system of the city.

The Directors of the Tunbridge Wells Gas Company have appointed Mr. Andrew Dougall, who has been for some time Manager of their Works, to be Engineer and Manager; as it is not their intention to have a Consulting Engineer in succession to the late Mr. R. P. Spice.

The European agency of Mr. Fred. H. Whipple, of Detroit (Mich.), with whose publications on electric lighting, electric street railways, electric industries, and water supply, some of our readers may possibly be acquainted, has recently been taken up by Messrs. Woodhouse and Rawson, Limited, of Queen Victoria Street, E.C.

Attention is called to the employment in France, for steam and water pipe joints, of gaskets made of wood pulp, which are claimed to be more economical than the ordinary rubber gaskets, and are not subject to decomposition by high temperatures. Care is taken in the preparation of the pulp to select woods free from ingredients which might attack metals. The compressed pulp gaskets are boiled in linseed oil, and in practical use have, it is said, given very satisfactory results.

Mr. James Beal, whose name is closely associated with the movement for municipal reform in the Metropolis, and, as a collateral branch of this subject, with the question of the acquisition of the gas and water undertakings by some public authority, was presented, at a luncheon held at the Criterion last Saturday (Sir T. Farrer presiding), with a testimonial in the form of a timepiece and a purse containing nearly £500, in recognition of his long services, extending over a period of forty years, in connection with the movement.

Our readers may be aware that Sir J. B. Lawes, Bart., has endowed the Rothamstead Agricultural Experimental Station with the sum of £100,000, for the purpose of carrying on the investigations after his death. He has now appointed the Trustees, who have elected the following officers:—Dr. J. Evans (Treasurer of the Royal Society), Chairman; Sir J. Thorold, Deputy-Chairman; Dr. Hugo Mueller, Treasurer; and Mr. Herbert Cox, Secretary. The Trustees lately met at Rothamstead, and were conducted over the station by Sir J. B. Lawes and Mr. C. B. Lawes, and afterwards discussed the steps to be taken for making the trust.

In looking through the advertisements on the wrapper of to-day's issue of the Journal, our readers may possibly notice that the old-established engineering firm of Messrs. Bryan Donkin and Co., of Bermondsey, has been converted into a limited liability Company. This change is in consequence of the death of one of the partners last year; and it will not entail any change whatever in the management of the business, which, as formerly, will be in the hands of Mr. B. Donkin, jun., and Mr. E. B. Donkin. The Company is quite a private one; and these gentlemen, with Mr. F. Urwick, will be the first Directors.

Among the interesting scientific instruments shown at the *conversazione*, of the Royal Society last Wednesday, special attention was given to Professor Sylvanus Thompson's acoustic apparatus illustrating polarization of light, as well as a new form of gas battery—an improvement on the Grove battery—shown by Mr. L. Mond and Dr. Carl Langer, for producing moderate supplies of electricity. Highly ingenious and instructive was Mr. J. Aitken's apparatus for counting the dust particles in the atmosphere. His various appliances and the experiments he performs with them show strikingly the critical part performed by dust in the formation of clouds and fog; for without dust there would be neither. Professors Liveing and Dewar's exhibit of the absorption spectrum of oxygen was a fine illustration of the long series of experiments which have been carried out by these two chemists. This experiment shows the important part played by the atmosphere in limiting the rays which can reach us from the outside.

Essays, Commentaries, and Reviews.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 1186.)

The past week has been less sensitive to war alarms; and consequently there has been some recovery of prices in the departments most affected. Fine weather, too, has been in favour of traffics and crop prospects. Yet the tendency in general has not been very buoyant, owing to lack of support. A great deal more time now-a-days is given to play, instead of business, than used to be the rule in the good old days; and the fascinations of Ascot are paramount with many. Consequently there have been many absentees from Capel Court; and the aggregate of transactions has been very much limited. The Money Market has also been quiet, and shows no change. The Gas Department has shared the general quietude; and the changes of quotation are only two in number. There have been a few dealings daily in Gaslight "A," at about middle figures; the stock remaining fairly steady. The 10 per cent. preferences have also been lightly dealt in; but the prices were rather below the average. South Metropolitans have been quiet, and somewhat less firm; the "B" receding 2. The same may be said of Commercials, the old stock of which is 2 lower. A solitary transaction in Alliance and Dublin represents all the business effected among the Suburbans and Provincials. The Foreign division is also extremely quiet, and none of the issues present any feature calling for notice. The Water Companies, on the other hand, have been quite up to the average in point of business, and the tone is firm throughout; while some issues have moved up. Lambeth is the most noticeable; and the debenture stock has advanced 2½—influenced probably by the price put by the Directors upon the £25,000 of debenture stock which they are about to issue. The 7½ per cent. shares also are 1 higher; and a similar improvement has taken place in the same class of shares in Southwark and Vauxhall.

The daily operations were; Very moderate business in Gas on Monday. Prices generally were fair; but Commercial old and South Metropolitan "B" were done "specially" at low prices for exceptional amounts, and their quotations were lowered 2. Business in Water was restricted; but all issues dealt in marked good figures, and Southwark "D" advanced 1. Tuesday was a quiet day for Gas. Prices were about the average, though Buenos Ayres debentures were done at top figures. Water was brisker, especially Lambeth, the 7½ per cent. shares of which rose 1. Wednesday's Gas business was much about the same as the day before. Gaslight 10 per cents. changed hands at low figures. Everything else was fair. Water was quieter, but prices kept up well. Very little was done in Gas on Thursday, though Buenos Ayres was more than usually active, owing partly to realizations. Other issues dealt in presented no feature. Water was much the same as the preceding day. By Friday, business in Gas had fallen away to next to nothing. Water also was extremely quiet; but Lambeth debentures rose 2½. Saturday's business in Gas was naturally very restricted, and afforded nothing to remark. Nothing was done in Water, but a single transaction in Chelsea. All quotations remained unchanged.

THE PROJECTED NEW ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

A Meeting of the Gas Engineers and Managers who formed themselves into a Provisional Committee in March last to consider the advisability of founding an Institution that should be free from the disadvantages which it was considered attached to the constitution of The Gas Institute was held last Saturday at the Hôtel Métropole—Mr. W. Foulis in the chair.

The Honorary Secretary (Mr. Alfred Colson, of Leicester) read the minutes of the former meeting, on March 20; and they were confirmed. He also read a letter from Mr. R. R. Knight, of the Invercargill Gas-Works, New Zealand, expressing sympathy with the movement.

After a short informal discussion as to the method of procedure,

The Honorary Secretary read the report of the Sub-Committee appointed at the last meeting, which simply dealt with the various forms of constitution or incorporation, and the draft rules which had been prepared for consideration.

Mr. W. North (Stourbridge) said when the Committee adjourned it was understood that nothing definite was to be done until after the meeting of The Gas Institute, and his idea was that they were to endeavour to ascertain the feeling amongst their brother managers as to the desirability or otherwise of establishing a new Institution. It seemed to him that the vital question to be decided was whether or not such a new Institution should be formed; and he should like to know if anyone present was in a position to say what was the feeling exhibited at the meeting which had been held that week. His information was that the feeling shown at the meeting was practically unanimous in favour of the old Institute; and the question was whether, in the face of such a feeling, they would be justified in attempting to form a new one.

The Chairman said the Sub-Committee were appointed to draft rules and consider the best method of forming a new Institution, if it were resolved to form one. The question now was whether anything had occurred which would lead any of them to alter their views in the matter.

Mr. C. Eastwood (Liverpool) said he had attended the meeting of The Gas Institute held during the week; and his sole object in being present was to try and gather how far a new Institute would meet with success, and be likely to attract members, and whether any change of attitude had taken place amongst the members which would render the work of guiding and governing the Institute easier and more successful than it had hitherto been. On the first day he was rather surprised to see a very good representative gathering of all the old members, with the exception, perhaps, of a few of those from the southern districts, whose absence could easily be understood. Throughout the whole meeting there was a very good average attendance; but there was naturally a deficiency in the number and character of the papers and discussions. There was a very earnest desire shown all round that rules should be passed which would put what might be termed the trading or objectionable element under control; and before the mid-day adjournment on Tuesday he spoke to four members of the Council with reference to some additions which he suggested to their proposed rules. They said they intended to press the amended rules, and also to approve of the *addenda* which he was prepared to move. At that moment one of the most interested persons who would have been removed to the associate class, was quite prepared to submit to, and vote for every one of the amendments. But on reassembling in the afternoon, one of those fussy persons who were never satisfied unless they were concerned in everything, began to upset every arrangement, in consequence of which the members of Council asked for an opportunity to retire to reconsider their position. The upshot was that Mr. Garnett, President *pro tem.*, came back to the meeting and said, "Blessed are the peacemakers;" and forthwith withdrew from the consideration of the meeting the extraordinary resolution which should have been passed, as well as the amendment to Rule 2, which would have excluded any one acting for a trading or manufacturing firm. It has been reported that this was passed unanimously. But that was an error; for he and another member certainly voted against the postponement of Rule 2, and the withdrawal of the extra-ordinary resolution. The other rules were then taken in hand; and there seemed to be a wonderfully unanimous feeling to pass a rule which would place every member, associate, extraordinary members, or anyone else, thoroughly within the power of 50 sensible men to exclude him. It was scarcely possible to point out the bearings of this Rule 25 without alluding to a certain person who obtained a perpetual injunction which prevented the old Gas Institute from expelling him. This rule, as amended, gave power to a meeting of 50 persons to expel any disorderly person by a majority of one. Wishing, as far as possible, to prevent the formation of a new one, if they could possibly reform the old one so as to make it come within the scope of their wishes, he induced Mr. Bray, in the presence of witnesses, to vote for Rule 25, by which means he submitted himself to the ruling of 50 members at any meeting, and thereby put himself out of court for ever in any attempt to enforce the injunction. This injunction applied only to a certain state of things which now no longer existed; and he had by his own vote acquiesced in the new rule. Under these circumstances, the power to deal with obstructionists was entirely altered. Such was the extreme unlikelihood of their acquiring the adhesion of members of The Gas Institute, that it would be useless at the present to try and form a new Association. He would therefore propose that the consideration of the formation of any Institution be deferred for at least twelve months.

Mr. North said he would second this proposition *pro formâ*, for the purpose of eliciting discussion.

Mr. P. H. Wilkinson (Harrogate) said that he could corroborate what Mr. Eastwood had said. He bore testimony to the kindly feeling manifested at the meeting of The Gas Institute this year towards those who had resigned, and the regret which had been expressed at the disunion existing.

The Chairman said no one present had anything but the most friendly feelings towards the members of the old Institute; but it was not a question of feeling; they wanted, if possible, to have a society which should thoroughly represent the profession scientifically.

Mr. G. Livesey said the main reason of their meeting was the necessity which existed in the gas industry for a thoroughly representative organization. This necessity had never been greater than it was at the present time; and any division which led to estrangement was to be avoided. He was sure the members of the old Institute were perfectly sincere in their desire for union; but as yet they had done nothing to make union possible. There were several objectionable things connected with the Institute which rendered it undesirable for those who had left to think of rejoining it. On the previous Thursday he had the pleasure of receiving the members of the Institute at their East Greenwich works; but among them he found there were too many traders of the objectionable character—touting traders. Whatever he might have thought of Mr. Bray, he did not believe he had ever used his position as an extra-ordinary member of The Gas Institute to push his business. But there were a great many who did use the Institute solely for this purpose; and so long as these people remained in the Institute, they felt it was not creditable to the gas industry. For this reason he felt they could not re-unite with them, much as they would like it. The question of relegating the traders to the class of associates would not have met the difficulty at all. They would have the right to be present; and the most objectionable class of the traders would be there most. They did not want to speak or vote; but they went to the meetings merely to tout. He had every reason to believe that the members of the Council of the Institute were as anxious as they were that the Institute should be put on a proper footing; and he

thought they would at once take into consideration how to effect this object. His own conviction was that this could only be done by dissolution; and he had been told that the Council were prepared, if necessary, to face dissolution in order to secure what was desired. He was not prepared to support Mr. Eastwood's resolution to defer action for twelve months; but he thought they ought to give the Council a fair chance to show what they could do. If it met the views of the meeting, he should be glad to propose that they tentatively pass the rules which had been formulated, and appoint the Sub-Committee a permanent Committee with power to call them together at the expiration of six months, by which time the Council of The Gas Institute would have had an opportunity of seeing what could be done. He had no feeling on the matter, except the general welfare of the gas industry and the elevation of its representatives; and he felt that the Institute as it now existed was not calculated to elevate the status of gas managers.

Mr. EASTWOOD said he was not prepared to pass without further consideration the rules which had been drafted. They had already seen the evil that had arisen from ill-considered bye-laws in the past; and he should object *in toto* the meeting accepting the rules without having a printed draft of them in their hands.

Mr. LIVESEY said the rules would only be passed tentatively; they would have to be submitted to another meeting before being finally approved.

Mr. EASTWOOD said one rule seemed to him very objectionable. It referred to the qualification as "having been the pupil of a gas manager," and so on; but it did not provide that, although he might have been properly admitted in the first instance, he should cease to remain a member when his qualification had ceased.

The CHAIRMAN said they were not discussing the proposed rules, but their position in connection with the Institute; though he might say they met Mr. Eastwood's objection. It seemed to him that it was not a matter of their going to the Institute, but of the Institute coming to them. Looking at it in this light, the most common-sense and practical method was to go on with the rules, and form a Society on the basis they wanted; and then if the Institute chose to adopt their rules, they would be very glad to receive them. It seemed to him that they were asking the Institute to make a thoroughly radical change which would be impossible without dissolution.

Mr. C. HUNT said he would second Mr. Livesey's suggestion—that the rules be printed and circulated amongst the members of the Provisional Committee, and that the meeting be adjourned for six months; the Committee being continued in the meantime.

Mr. ROBERT MORTON thought if they did not at once come to a resolution to go on, as had been proposed, they ought really to approach The Gas Institute. A resolution ought to be passed that they should inform the Institute, through their Council, that they were quite ready to rejoin it if the objectionable element were eliminated, but that this could only be done by dissolution. If the Institute were prepared to face this, and bring it forward with any idea of carrying it, then they might consider whether or not they would wait for twelve months. But if the Institute were not prepared to do this, they were only losing time by waiting. It was clear to his mind that the only way out of the difficulty was by the dissolution of the Institute.

Mr. W. KING (Liverpool) thought they could not dictate to the Institute what they were to do. If there were really a desire on the part of the Institute for a reunion, it seemed a pity that they should, by any undue haste, interfere with so desirable a consummation. It might hamper them in any subsequent proceedings to fix a definite time for adjournment; and he thought it would be a wiser course to adjourn *sine die*.

Mr. C. GANDON wished to add his testimony to the remarks that had fallen from Mr. Livesey and Mr. King. Probably many of those present felt that they could not rejoin the Institute as at present constituted, but at the same time the policy of starting a rival Association was very doubtful. They ought to give the Institute time to prosecute their endeavours to meet the objections which had been the cause of so many retiring from it. Nothing would give him greater satisfaction than to know that the obstacles which now existed had been removed; but the idea of two rival Institutes was repugnant to hm. Though, if they were satisfied that the old Institute were moribund, he should be the first to advocate the formation of a new one, yet the time had hardly arrived for them to come to this conclusion.

Mr. NORTH thought it would be hardly wise to try to form a new Institution in the face of the old one being willing to meet their wishes.

Mr. G. C. TREWBY said there were many of his colleagues who did not belong to the Association, amongst whom the feeling was that they wanted an Institution of a more scientific character, and one that would uphold the interests of the gas profession. If they formed themselves into a Standing Committee and put these rules forward as the basis on which they were ready to rejoin the old Institute, it would be a manifestation on their part which the Institute might take notice of or not.

Mr. NORTH said it would have been better if the Institute had settled the question of the admission of traders once for all; but the private feeling seemed to be that they ought somehow to approach one another.

Mr. J. L. CHAPMAN (Harrow) said it seemed to him that it would be necessary, if The Gas Institute was to succeed, that it should dissolve and recommence on the lines they suggested. He agreed with the idea that the proposed rules should be printed and circulated.

Mr. EASTWOOD, on the suggestion of the Chairman, withdrew his resolution for the adjournment of the meeting for twelve months in favour of Mr. Livesey's amendment that the rules should be printed and circulated, and the Sub-Committee have power to call the meeting together again at the end of three months, or such other time as they might deem necessary.

Mr. HUNT said that the amendment which had been proposed by Mr. Livesey and seconded by himself was—"That the Sub-Committee be appointed a Standing Committee with general powers; that the rules, as submitted, be printed and circulated amongst the members of the Provisional Committee; and that the Sub-Committee be empowered to call another meeting of this Committee at the expiration of three months, or at such other time as may be deemed by them desirable."

This was put to the meeting, and carried unanimously.

The CHAIRMAN suggested that the number of the Committee should be increased; and

On the motion of Mr. NORTH seconded by Mr. MORTON, Mr. William King was added to the Committee.

Mr. LIVESEY moved that the report of the proceedings be published in the JOURNAL OF GAS LIGHTING.

Mr. NORTH seconded the motion, and it was unanimously agreed to.

Mr. LIVESEY moved that the best thanks of the meeting be given to the Sub-Committee for the admirable work they had done in drafting the rules and other matters.

Mr. CORBET WOODALL seconded the motion, which was put, and carried unanimously.

Mr. COLSON, on behalf of the Sub-Committee, returned thanks; saying that what they had done they had done with very great pleasure. They would be pleased to continue their services.

On the motion of Mr. LIVESEY, a hearty vote of thanks was passed to Mr. Foulis for presiding.

The CHAIRMAN returned thanks; saying that he should certainly feel that he had been amply rewarded for the trouble he had taken if it all ended in a successful Institution being formed.

The proceedings then closed.

THE VISIT OF MEMBERS OF THE GAS INSTITUTE TO PARIS.

A correspondent, one of the party of members of The Gas Institute who are now visiting Paris, has sent us the following account of their proceedings:—

Last Friday a large party of members of The Gas Institute started for Paris, in accordance with the arrangements already announced. Leaving London at about 9 a.m., they travelled *viâ* Newhaven and Dieppe, and from thence through the picturesque district of Normandy, passing the old city of Rouen, with its remarkable iron spire, where they were joined by some who had proceeded thus far on the previous day, and arriving in the gay city about 6.30 p.m. The usual delays in obtaining luggage, settling down at hotels, &c., occupied the greater part of the evening; but on Saturday morning the exhibition was the principal attraction—the Gas Pavilion and the Machine Gallery being the first sights that were taken. A large number availed themselves of the beautiful weather to make the ascent of the far-famed Eiffel Tower. The working of the lifts was very satisfactory, so far as the mechanical part of them was concerned; the ascent being accomplished with remarkable ease and steadiness. The second platform is reached in about three minutes; and from a height of nearly 400 feet above the grounds the visitors were able to take a preliminary survey of Paris and its surroundings previously to accomplishing the remainder of their upward flight. The lifts between the second and third or topmost platform are evidently not yet completed, and in their present form were quite inadequate to meet the demand; so that it was necessary to wait, in some cases as long as an hour and a half, before the final journey to the top could be taken. Once there, however, the effect was unique. The city of Paris—with its splendid buildings, its large open spaces, its boulevards with their rows of trees, its numerous elegant bridges over the Seine, and its extensive public gardens—is particularly well suited for a bird's-eye view from an altitude of nearly 1000 feet; and those who made the ascent will not soon forget the beautiful prospect afforded to them. The exhibition buildings in the foreground, far below their feet, and the numerous beautiful features of the city, could all be perceived and duly appreciated.

Those whose experience of international exhibitions has been confined to our own, can scarcely form any idea of the extent to which the aid of the architect and landscape gardener has been called in for the purpose of arranging the vast extent of ground that has been so admirably laid out, in a style both of architecture and horticulture that is practically unknown on our side of the Channel. The size of many of the buildings is a remarkable feature—that of the machinery gallery for example, the roof of which is considerably higher and wider than that of the St. Pancras Station in London, while the space covered is such that it would be possible to place the station named within it, and leave a clear roadway all round. The building is 478 yards long by 126 yards wide, and the roof is supported by wrought-iron girders—a mode of construction generally adopted throughout, and one that lends itself admirably to this light and elegant style of construction. The machinery hall occupies what one may term the back half of the main building. Access is obtained to it by a long central corridor or gallery, having a magnificent vestibule at the entrance,

surmounted by the central dome which is a prominent object from many parts of the city. Various departments devoted to the different branches of the fine arts are situated on either side. In this corridor the effect of the colouring is simply superb. The wrought-iron balustrading of the staircase at the end will attract particular attention, on account of the lightness and elegance of its general design.

I must reserve anything in the way of a detailed notice of the machinery and gas exhibits till next week; but may remark that the principal objects of attraction in the machinery gallery are some very accurate models and sections of coal mines and of iron-smelting works. The degree of finish given to the models, and also to the mechanical drawings, is far superior to that usually found in England, though it must be admitted that some English firms have sent models which it would be difficult to surpass. The models of various large bridges, together with the full particulars given of them, cannot but be useful to students. There are several large gas-engines; and Mr. Edison, of electrical fame, has an extensive stand, showing his various inventions. It is scarcely necessary to add that the specimens of steam-engines of various kinds to be seen here are a great attraction; as is also the electric light machinery. The exhibits are well arranged for inspection, but rather more with an eye to effect than to distinct classification. In the railway department some interesting applications of steam to locomotion on the small scale are observable, in the shape of road vehicles suited for two or three persons, with boiler and engine complete.

In the building presumably devoted to gas—situated in the exhibition grounds, to the left of the Eiffel Tower—the visitors were able to gain some new ideas as to French methods of constructing gas apparatus; though at the same time they met with some familiar articles in the exhibits of Messrs. T. Fletcher and Co., Messrs. H. and C. Davis and Co., Mr. C. Wilson, and other well-known English firms, who have sent excellent examples of their manufactures; showing the degree of elegance and refinement to which the design and construction of these appliances has been brought in England. This building has already been described in detail in the JOURNAL; but it may be remarked that the arrangements of the model kitchen will prove most interesting to those accustomed to cope with the difficulties incidental to the introduction of gas-stoves into English kitchens. There is a spacious hood for conveying away the whole of the products of combustion. The selection of utensils of copper and enamelled iron is worthy of notice; and especially a series of coloured cartoons, illustrative of the various uses of gas. There are several sheets, and each sheet comprises some 20 small pictures, about *carte de visite* size, representing gas in use for lighting, heating, cooking, laundry work, in the laboratory, in hairdressers', tailors', and hatters' shops, and gas-baths, &c. They furnish a simple and attractive way of advertising the uses of gas.

THE BOARD OF TRADE RETURNS RELATING TO AUTHORIZED GAS UNDERTAKINGS.

WE conclude to-day our comments (commenced in the JOURNAL for the 4th inst.) on the above-mentioned returns.

If we turn to the comparative tables given at the end of the parliamentary papers, we find, on comparing the figures for the latest year (1887) with those of its predecessor, that the twelve-months' increase in the total working capital of the Local Authorities' undertakings was at the rate of 1·82 per cent.; while the work done, for which that capital was employed, shows an increase at the rate of 3·65 per cent. in the entire bulk of coal carbonized, of 4·24 per cent. in the total quantity of gas made, and of 3·97 per cent. in the gas sold. At the same time there was an increase at the rate of 5·02 per cent. in the length of gas-mains, of 1·45 per cent. in the number of consumers, and of 2·14 in the number of public lamps lighted. Comparing this with the work of the undertakings of the Companies, we note that the increase in the actual working capital of the latter was at the rate of 2·07 per cent., while their coals carbonized increased by 3·45 per cent., their make of gas by 3·75 per cent., their sale of gas by 3·56 per cent., the length of their gas-mains by 2·69 per cent., the number of their consumers by 1·61 per cent., and their public lamps by 2·42 per cent. Taking both classes together, it results that the actual working capital employed by all the authorized gas undertakings of the United Kingdom included in the returns was 2 per cent. more in 1887 than in 1886, whilst the work done increased in a greater ratio; the accompanying growth under the different heads given being as follows:—In the number of the undertakings, 2·41 per cent. (viz., Local Authorities 3·78 per cent., and Companies 1·86 per cent.); coals carbonized, 3·52 per cent.; make of gas, 3·91 per cent.; sale of gas, 3·69 per cent.; miles of mains, 3·44 per cent.; consumers, 1·54 per cent.; and public lamps, 2·33 per cent. Seeing that the returns generally indicate a somewhat better average on the whole for the Companies than for the Local Authorities; it is not surprising that the percentage of increase or improvement should be slightly higher in the case of the latter, as shown by the figures. This fact is to the credit of the Local Authorities; but it must not be taken to mean more than that the greater improvement has been effected where there was the greater need for it.

There is, however, another aspect of this increase, which was submitted to our readers in our "Correspondence" columns by Mr. Charles Hunt, first in December, 1886, and again in January last year, controverting views which we had ourselves antecedently advanced.* Our contention having been that the growth of the authorized gas undertakings (dealt with in the returns) from 1882 to 1885 had cost the Local Authorities as much as £7 7s. 2d. for additional capital per additional ton of coal carbonized; whereas the like cost to the Companies had only been £4 7s. 9d. Further, that although this charge, on the growth from 1885 to 1886, had been reduced to £5 6s. 2d. in the case of the Local Authorities, yet this still left a balance of 18s. 5d. of cost, adverse to them. Mr. Hunt, in his first letter, claimed that all new transfers should have been deducted from the Local Authorities' figures, which would have the effect of turning the tables slightly in favour of the Authorities, as showing them to have carbonized their additional tons of coal at an additional capital cost of £4 6s. 6d., as against £4 7s. 9d. in the case of the Companies; and in his second letter he claimed that a similar comparison for the years 1885 and 1886 would show that the Companies had raised £6 16s. 7d. additional capital per additional ton of coal carbonized, as against only £1 1s. 5d. in the case of the Local Authorities. In opposition to this contention, we deprecated any appeal to the results of a single year as fallacious; and showed that on the average of five years, taking the sale of gas as the standard unit, every additional million cubic feet of gas sold had cost the Companies only £476 additional capital, as against £506 in the case of the Local Authorities. At the same time, we gave the results, as from Mr. Hunt's standpoint (for that year) as £4 10s. 10d. per ton additional in the case of the Local Authorities, compared with £4 17s. 6d. for the Companies; and we pointed out, in addition, that if Mr. Hunt had gone a single year farther back he would have found that for 1884-5 every additional ton of coal carbonized had cost the Local Authorities £4 2s. 9½d., but the Companies only £3 0s. 4¾d.

Resuming the examination of this matter in the light of a year's later returns, and thus comparing 1886 and 1887, we find that the additional tons of coal carbonized are shown to have cost the Companies £3 6s. 6·53d., and the Local Authorities £3 0s. 0·24d. of additional capital—a comparison once more slightly favourable to the latter; the aggregate general average working out at £3 4s. 2·84d. per ton. Taking the measure of the growth as given by the increased quantity of gas sold, it appears that every million additional cubic feet of gas sold cost the Local Authorities £301 and the Companies £341 of additional capital. It seems to us perfectly obvious, therefore, that the annual fluctuations in this respect are not of a nature, nor sufficiently free from the influence of causes which have nothing to do with economical working, to make the annual comparisons reliable as indications of better management or the reverse—confirming our previous conclusions. We, consequently, revert to our original starting point, and feel justified in contending that, inasmuch as the additional capital charges connected with transfers involve a permanent charge on the undertaking, they cannot properly be omitted from consideration. Thus, comparing the statistics for 1882 with those for the latest year, 1887, upon this basis, the additional capital outlay incurred in connection with the extra work done amounted to £4 7s. in the case of the Local Authorities, and to £3 5s. 1d. in the case of the Companies, per additional ton of coal carbonized, or to 8s. 9·15d. and 6s. 4·15d., respectively, per 1000 cubic feet additional of gas sold (equivalent to £438 and £317 per million); showing an advantage in favour of the Companies of 21s. 11d. per ton of coal carbonized, and 2s. 5d. per 1000 cubic feet (or £121 per million) of gas sold. Although this difference is somewhat greater than the result obtained two years previously, we do not desire to lay too great a stress upon this aspect of the case, in view of the extraneous influences and elements of uncertainty which we have already mentioned. The chief object, in thus re-stating the matter, and re-establishing our former conclusion, is to show that it was originally arrived at in a perfectly natural way and on reasonable grounds, which the further experience of two years returns has at least confirmed, if not strengthened.

The foundation of the difference which has thus been brought into relief is undoubtedly the greater burden of capital initially thrown on the Local Authorities, in most cases, by the cost of the purchase and transfer of the undertakings. Upon this point the figures for the year under review may here be briefly summarized, as proving that the Local Authorities had raised, as shown in the concluding table of our last article (*ante*, p. 1037), £6 14s. per ton of coal carbonized, or 14s. 7½d. per 1000 cubic feet of gas sold, as compared with £6 3s. 8¼d. and 13s. 0¾d. respectively in the case of the Companies. As one indication of a similar difference in point of practical working, we may place in juxtaposition the average number of cubic feet sold per ton of coal carbonized and per pound of working capital—viz., 10,015 and 1356 cubic feet for the Local Authorities, and 10,251 and 1504 cubic feet for the Companies respectively. As regards the pecuniary results, the figures to be contrasted are, we may repeat, those showing the return yielded by the gross profits in the hypothetical form of interest on working capital—viz., 6·65 per cent. for the Local Authorities, and 8·82 per cent. for the Companies.

Under the latter head it is to be noted that a small proportion (1·63 per cent.) of the undertakings did not make any gross profits, but were worked at a loss, varying from £1 to £277. Their total number was only nine—viz., four Local Authorities and five Companies. Further, there were four undertakings (two Local Authorities and two Companies) whereof the gross profits are not

* See JOURNAL, Vol. XLVIII., pp. 965, 1022; and Vol. LI., pp. 141, 199, 273, &c.

equivalent to so much as 1 per cent. on the working capital; and six more (two Local Authorities and four Companies) which did not attain to the modest level of 2 per cent. It must be borne in mind that our point of view here has nothing to do with the dividends actually paid, but relates solely to gross profits, or earnings out of which dividends may or may not be paid. The payment of dividend is, to some extent, a very different thing; dividends being not unfrequently paid which have not been earned during the current period to which they refer—*i.e.*, out of undivided profits and reserved funds. Or, on the other hand, if inadequate to pay statutory dividends, the profits are carried forward. Thus, of the five Companies above named which only "earned a loss," four paid no dividends; but in the case of one of them (Horley District) 2 per cent. dividend was paid. On the other hand, there are several instances of Companies with a fairly respectable return, by way of gross profits, in which no dividend was declared. For example, at Formby, the gross profits (£519) represent 6·34 per cent. on the working capital of £8184; and deducting £125 for interest on loan capital (£2500 at 5 per cent.), the balance, £394, would have sufficed to pay 6·93—say, 7 per cent. on the share capital, £5684. But, according to the return, no dividend was paid. It is possible, however, that the return was purposely left blank in this, as it most certainly must have been in that of the Company at Emsworth, where no dividends are shown, although the gross profits (£292) are equivalent to 8·34 per cent. on the working capital (£3500); and deduction being made for interest on loan capital (£900 at 5 per cent.), say, £45, the balance of £247 would suffice to pay a dividend of 9½ per cent. on the share capital of £2600. The presumption that some such dividend as the statutory 10 per cent. was actually paid amounts to a certainty—the Board of Trade return to the contrary notwithstanding. The probability lies in the other direction in two other cases—viz., Westgate and Birchington, and Kirkheaton, Dalton, and Lepton, where the gross profits, after payment of debenture interest, would suffice to pay dividends amounting to 3¼ and 3½ per cent. respectively on the share capital. Here it is conceivable that the payment was foregone, as in the remaining eight cases of "no dividend."

The following tabular statement shows the number of undertakings—distinguishing between Local Authorities and Companies and the relative proportions of each—showing earnings by gross profits (or losses as the case may be) at the various rates of interest named, as well as what percentage ratio the respective numbers in each of the two classes of undertaking, as also in the two together, bear to the total number in each class and the aggregate total:—

Quasi-Earnings.

Particulars.	Percentage Proportion.		Local Authorities. No.	Companies. No.	Total Undertakings. No.	Percentage of Total Number.		
	Local Authorities.	Companies.				Local Authorities.	Companies.	Total Undertakings.
Totals.	30·49	69·51	168	383	551	100·00	100·00	100·00
Returning per cent. on capital.								
Above 40 p.c. (42·59)	100·00	0·00	1	—	1	0·59	0·00	0·18
„ 25 p.c. (29·03)	0·00	100·00	—	1	1	0·00	0·26	0·18
„ 20 p.c. (21·19)	100·00	0·00	1	—	1	0·59	0·00	0·18
„ 15 and up to 20 p.c.	33·33	66·67	1	2	3	0·59	0·52	0·54
„ 10 „ 15 p.c.	22·03	77·97	13	46	59	7·74	12·01	10·71
„ 9 „ 10 p.c.	18·37	81·63	9	40	49	5·36	10·44	8·89
„ 8 „ 9 p.c.	11·54	88·46	9	69	78	5·36	18·02	14·16
„ 7 „ 8 p.c.	28·57	71·43	30	75	105	17·86	19·58	19·06
„ 6 „ 7 p.c.	35·80	64·20	29	52	81	17·26	13·58	14·70
„ 5 „ 6 p.c.	46·43	53·57	26	30	56	15·48	7·83	10·16
„ 4 „ 5 p.c.	50·00	50·00	26	26	52	15·48	6·79	9·44
„ 3 „ 4 p.c.	29·63	70·37	8	19	27	4·76	4·96	4·90
„ 2 „ 3 p.c.	36·84	63·16	7	12	19	4·17	3·13	3·45
„ 1 „ 2 p.c.	33·33	66·67	2	4	6	1·19	1·05	1·09
„ 0 „ 1 p.c.	50·00	50·00	2	2	4	1·19	0·52	0·73
Loss 0 to 6 per cent.	44·44	55·56	4	5	9	2·38	1·31	1·63

We may note that under the column of dividends paid, in the returns, five Companies paid 3 per cent., four Companies paid 2 per cent., and three Companies paid from 1 to 2 per cent., in pretty close accord with their earnings, excepting only as to Horley aforesaid and Garstang, which likewise paid 2 per cent. dividend out of earnings representing a fractional dividend of 0·05 per cent. The lowest dividend recorded—1 per cent., by Cleveland—was fairly earned by 1·15 per cent. profits. Of the total number of dividend-paying Company undertakings—viz., 364 out of 383—the remainder, which declared dividends higher than 3 per cent., are distributed in the following proportions, according to interest paid:—3 (*i.e.*, 0·78 per cent. of the total) paid more than 3, but less than 4 per cent.; 5 (or 1·31 per cent. of the total) paid more than 4, but less than 5 per cent.; 27 (or 7·05 per cent.) paid more than 5, but less than 6 per cent.; 17 (or 4·44 per cent.) paid more than 6, but less than 7 per cent.; 38 (or 9·92 per cent.) paid more than 7, but less than 8 per cent.; 39 (or 10·18 per cent.) paid more than 8, but less than 9 per cent.; 22 (or 5·74 per cent.) paid more than 9, but less than 10 per cent.; 163 (or 42·56 per cent. of the whole) paid dividends exceeding 10, but less than 11 per cent.; 19 (or 4·96 per cent.) paid more than 11, but less than 12 per cent.; 7 (or 1·83 per cent.) paid over 12, but under 13 per cent.; 5 (or 1·31 per cent.) paid over 13, but under 14 per cent.; 3 (or 0·78 per cent.) paid between 14 and 15 per cent., and the same number between 15 and 16¼ per cent.; while, lastly, and *longo intervallo*, 20 per cent. dividend was attained in one single instance—the fortunate (original) shareholders of the Kingston-upon-Hull Gaslight Company receiving £4 per share which, we are told, was of the market "value of £54 to £56." The second on the list was Pontypridd, paying 16¼ per cent. (10 per cent., and 6¼ per cent. on account of arrears) and having earned about 13 per cent.; the third place being held by the South Metropolitan Gas Company, which earned 12½, and paid 15½ per cent. It must be understood that we are now speaking only of maximum dividends on ordinary stock, and not of smaller dividends simultaneously paid on preference or other limited shares or stock. In most cases the dividends have been fairly earned, or more than earned; but there is one notable instance of the reverse, where, in fact, the reserve of undivided profits has been largely called in aid—viz., at Ashton-under-Lyne. Here the return shows that the earnings represent not more than 5 per cent., whereas the dividend actually paid was 14 per cent. We need scarcely remind our readers that Ashton has figured in the Law Courts *re* accumulated profits and their disposal.

Thus, out of 383 Companies—including four which earned a loss and paid no dividend, one which earned a loss but paid a small dividend, twelve which made small profits but (apparently) paid no dividend, and three which had only works in course of construction and incomplete—no less than 201, *i.e.*, 52·48 per cent., paid maximum dividends of 10 per cent. and upwards; while 182, or 47·52 per cent. paid dividends ranging from 10 per cent. downwards to *nil*. Now, if we examine the table of *quasi*-earnings, we shall find that these exceeded 10 per cent. in the case of only 49 Companies, or 12·79 per cent. of the whole. There were therefore something like 152 Companies, or 39·69 per cent. of the entire number, who had recourse to undivided profits, to a greater or less extent, to make up their dividends.

Detailed examination of the returns establishes the fact that, if there is any connection at all between the price of gas and the dividend, it must be rather inverse than direct. The lowest prices for gas are to be found at Plymouth, Newcastle-on-Tyne and Gateshead, and Sunderland, ranging from 1s. 9d. to 2s. per 1000 cubic feet. Of these the first-named pays 12½, the second 9, and the third 10 per cent. On the other hand, the highest prices are found at Walton-on-the-Naze (7s. 6d. per 1000 cubic feet), which "earned a loss" of 0·03 per cent.; Dysynni (7s. 6d. per 1000 feet), which paid no dividend; Menai Bridge (6s. 8d.), which paid its proprietor 3½ per cent.; Lampeter (6s. 6d.), no dividend; Enniskillen (6s. 6d.), dividend of 1⅝ per cent.; Connah's Quay (6s.), no dividend; and Grange and Cartmel (6s.), dividend 3 per cent. Thus it would seem that high price spells bad management and no or low dividend, and *vice versâ*, so far at least as the Companies are concerned. The only important exception to this rule is the small private undertaking at Bungay, where 5s. per 1000 cubic feet is charged for gas, and the profits are equivalent to 10·35 per cent. upon the capital.

Without asserting that the same order of things prevails, or should prevail, among the Local Authorities gas undertakings, we are content to remark that among them the highest price is to be found at Bethesda and Dunbar (6s. 3d. per 1000 cubic feet) and at Peterhead (6s. 3d., with 5 per cent. discount). Now the returns show gross profits amounting to 2·56 per cent. on the working capital in the first case, 6·74 per cent. in the second, and 0·86 per cent. in the third. *Per contra*, although at Leeds, where the lowest price (1s. 10d. per 1000 cubic feet) is to be found, the gross profits are but 3·82 per cent. on the capital; yet there are 13 other Local Authorities with prices below 2s. 4d. per 1000 cubic feet, where the gross profits run from 5·19 (Tipton) up to 9·89 (Brighouse) and 10·18 (Burnley) per cent. on the capital.

It may be interesting, and certainly instructive, to accentuate these contrasts by placing them in tabular form, side by side, and supplementing them with other details; selecting for the purpose the best and the worst examples of a Company and a Local Authority with a low and with a high price for gas, as will be seen on the next page.

Particulars, 1887-8.	Companies.			Local Authorities.	
	Plymouth.	Walton-on-the-Naze.	Connah's Quay.	Peterhead Gas Commission.	Burnley Corporation.
Price of gas per 1000 cubic feet	1s. 9d.	7s. 6d.	6s. 0d.	5s. 11½d.	2s. 3d.
Capital per ton of coal carbonized . . .	£2·05	£14·05	£65·1	£11·4	£3·6
„ per 1000 cubic feet of gas sold . .	4s. 0·00d.	97s. 5·00d.	229s. 7·00d.	29s. 10·00d.	7s. 9·00d.
Receipts „ „ . .	2 6·61	13 2·11	14 9·37	6 11·41	2 10·36
Expenditure „ „ . .	2 1·35	13 2·44	9 2·69	6 8·34	2 0·99
Gross profits „ „ . .	5·26	(Loss) 0·33	5 6·68	3·07	9·37
„ proportion to capital, per cent. .	10·98	(Loss) 0·03	2·42	0·86	10·13
Gas made per ton of coal carbonized . c. ft.	10,878	4,856	7,640	10,044	9,796
Gas sold „ „ „	10,187	2,886	5,672	7,651	9,336
„ per £1 of capital . . . . „	5,007	205	87	670	2,619
Proportion of sale to make, per cent. . .	93·65	59·39	74·24	76·17	95·30
„ loss to make, „ . .	6·35	40·61	25·76	23·83	4.70

The "sweet simplicity" of gas making could scarcely be more fully realized than by the now happily extinct Company at Walton-on-the-Naze, in relation to which we gave some particulars in a former notice of these returns (*ante*, p. 850). With a loss of *only* a little more than two-fifths of the entire make of gas, they succeeded in selling as much as 2886 cubic feet of gas per ton of coal carbonized! Commencing with receipts of upwards of 13s., they end with a dead loss of 0·33d. per 1000 cubic feet of gas sold! The moral to be drawn from the foregoing tabular statement (and other data derived from the returns) is that a high price of gas and proportionately large receipts are by no means essential elements to success, but seem rather to be a temptation and a snare. By means of a big yield of gas per ton of coal carbonized, the avoidance of waste, and the reduction of expenditure, it is evident that gas can be delivered at the point of consumption at a very low price; and unless the working capital be disproportionately heavy, a very small margin of profit will suffice to realize handsome returns. The Plymouth Company, as we have seen, pay 11 per cent. with a surplus of but 5¼d. of gross profits per 1000 cubic feet of gas sold. Even a smaller sum is enabled to pay handsomely, as at Rochester, where a gross profit of 4·94d. per 1000 cubic feet of gas sold represents 8·25 per cent. on the capital; and at Luton, where 4·33d. gives 8·14 per cent.—averaging not quite 2 per cent. per 1d.

Perhaps the most remarkable example of small profits showing a high return is that of the Carlisle Corporation, where the gross profits are stated to have been 5·96d.—say, 6d. per 1000 cubic feet of gas sold, their actual amount being £4259; and as the capital is set down at £10,000, the gross profits are equivalent to 42·59 per cent. thereon. This is another of those apparent anomalies with which the Board of Trade returns are studded. It arises from the fact that the column headings are misleading, and that the figures given are not what they profess to be, and do not represent the facts. Comparing the latest returns (of 1888) for 1887 with those (of 1887) for 1886, and for previous years, we find that the "Total Amount of Money Borrowed, including Capitalized Value of Annuities (not deducting amount repaid)" was, for Carlisle, £18,000 for 1882-3, 1883-4, 1884-5, and 1885-6; £18,227 for 1886-7; and finally £10,000 for 1887-8—£8227 having been paid off in 1886, as duly entered in the returns for that year. It is obvious that the original intention of the framers of these returns was that column 5 should represent the total capital outlay on the works, from the outset down to the latest date; column 7 being devoted to a record of repayments and redemptions, sinking funds, &c.—so as to be comparable with the sum total of share and loan capital (columns 3 and 7) of the Companies' returns—*i.e.*, the "Amount Paid Up, and Borrowed" in the comparative tables. The adoption of any other course renders the returns comparatively valueless, especially if occurring here and there only, in isolated cases.

If we are to be told, as we have just been told, in reply to our criticisms, that these things occur "by inadvertence," we feel disposed to traverse that plea *in toto*. It is impossible that instructions so plain, that those who run may read, can be so set aside by responsible officials in contributing important statistics to a prominent Government Department. We refuse to believe that the figures for six months under three items only can be mixed up with the figures for twelve months under all other heads, or put forward, accepted, and issued, "by inadvertence"—excepting on the one and only theory that anything is considered to be good enough for the Board of Trade—the universal feeling being that the returns are of no value except as waste paper. How otherwise would it be possible for such returns to pass muster as some of those to which we have already adverted; or, to give one more instance, those of the Festiniog Local Board? This is their record of practical work:—1884-5: No coals and no make of gas given. 1885-6: Gas made 18,545, sold 14,406 cubic feet per ton of coal carbonized; loss 22·32 per cent. 1886-7: Gas made 16,616, sold 13,481 cubic feet per ton of coal carbonized; loss 18·83 per cent. 1887-8: Gas made 7217, sold 6702 cubic feet per ton of coal carbonized; loss 7·14 per cent.

This leads us to ask: What dependence can be placed on returns in which the capital may range from 11s. 6½d. to £230 per ton of coal carbonized; from 14d. to £59 12s. per 1000 cubic feet of gas sold; wherein the make of gas may vary between (less than) 5000 and (more than) 18,000 cubic feet, and the sale of gas may be anything less than 3000 and (more than) 11,000 cubic feet per ton of coal carbonized, or between 50 per cent. and 815 per cent. upon the make of gas; wherein the sale of gas may be less than half the make of gas for the same undertaking in the same year; and where, as in the case last quoted, the make and sale of gas per ton of coal for the same undertaking, fall off in quantity by more than 61 per cent. and 50 per cent. respectively. For examples, refer to the figures given above, and the case of Colwyn Bay (No. 11 on p. 4 of the Companies' return), where the make of gas is returned as 15,335 cubic feet per ton of coal carbonized, while the sale was only 7646 cubic feet, or 49·86 per cent. of the make—showing a loss of 50·14 per cent.

We must here repeat that we are far from asserting or believing that all these anomalies—some of them outrageous absurdities—exist, or ever have existed, outside the pages of the Board of Trade returns. It suffices for the purpose of our contention that in those pages they appear to have existed.

Technical Record.

MODERN GAS ANALYSIS.

Two new forms of apparatus for conducting the analysis of coal gas, flue gas, or any similar gaseous mixtures, have lately been described. Although their principal claim to novelty rests rather in the modification of details than in any new departure from the lines of procedure previously followed, they are to be welcomed as attempts to render more easy and accurate a process with which every gas engineer may well be acquainted—*i.e.*, the partial analysis at any rate, of a sample of illuminating or heating gas. And therefore it is proposed to describe them in these columns, with the aid of illustrations, lent by the Editors of the *Society of Arts Journal* and the *Journal of the Society of Chemical Industry*, in which the illustrations here given originally appeared.

The first form of apparatus is that used by Mr. Charles J. Wilson, of the University College, London, in connection with the trials of motors for electric lighting conducted by the Society of Arts; and it was by its means that the analyses of London gas which we have already quoted (*ante*, p. 615) were obtained. In the accompanying engraving (fig. 1), A is the apparatus, and B a tube for taking a sample of gas; *a* being the eudiometer, shown partly filled with mercury, and *d* the laboratory vessel. There is a tap at *b*, and a three-way cock at *c*; and the connection between the two vessels is made by means of a piece of thick india-rubber tubing at F. The lower end of the eudiometer is sealed in mercury contained in a cylindrical vessel, with an enlarged head as shown, the height of which can be adjusted by blocks as desired. A deep funnel or cup is provided in connection with the three-way cock *c*; and a mercury bottle of the usual construction is connected to the other end of the laboratory vessel by means of stout rubber tubing. The sampling-tube B consists of a closed piece of wide glass tube having two small tubes attached, as shown, to the base, and turning up on either side, so as to give the whole an anchor-like shape. It is completely filled with mercury before use, and is connected with the gas supply by means of a piece of rubber tubing attached to one of the small tubes. The connecting-tube must be filled with the gas to be tested—by aspiration if necessary, or by allowing the gas to escape freely through it before connecting to the sampling-tube. The connection being made, the vessel is so inclined as to allow mercury to flow out of the opposite tube until only enough remains to seal the sample, and the rate of escape of mercury can be regulated as desired. The side tubes can then be filled with mercury and fitted with caps.

In order to conduct an analysis, a sufficient quantity of gas is conveyed from the sampling-tube to the eudiometer, and its volume measured. The apparatus being in the position shown, with the stopcocks *b* and *c* open, the gas passes over into the laboratory vessel *d*, followed by sufficient mercury to drive all the gas out of the capillary tube. The two ends of the rubber tubes at *f* are made funnel-shaped, so as to grip the tube; and by lowering the eudiometer a little when gas is passing from *a* to *d*, and raising it for the passage in the other direction, the whole of the gas is driven out of the tube by the current of mercury. The cock *b* is then shut, and the appropriate reagent is poured into the cup *e*. It it admitted into the laboratory vessel by the three-way cock. The tap at the base of the laboratory vessel is closed, and the reagent left in contact with the gas until the reaction is complete. When this is the case, the mercury bottle is placed on the upper shelf shown near *f*; the cocks are opened; and the gas is forced back into *a*. When the reagent (which floats on

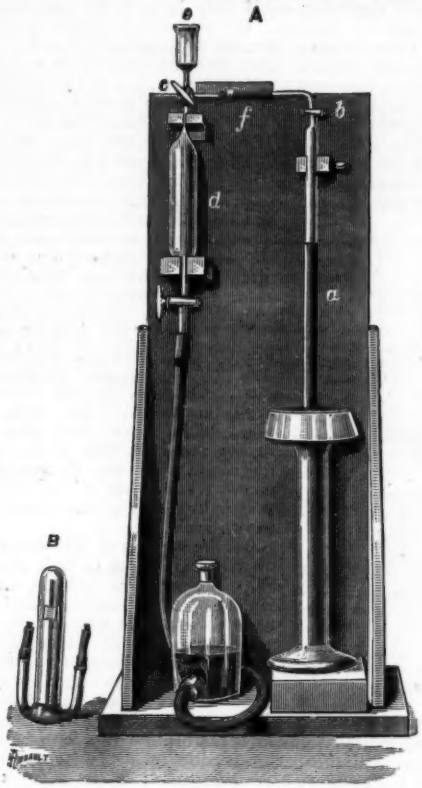


Fig. 1.

the top of the mercury) rises to *c*, the three-way cock is turned so as to allow it to be driven back into *e*. The capillary tube can be cleared by driving mercury over; and the amount of absorption arrived at by reading off the volume of gas in the eudiometer. The used reagent is then removed from *e*, and replaced by another; and the gas can thus be treated for each of the absorbable constituents in succession. The means adopted for exploding the residual hydrogen, &c., are not described.

The sampling-tube B is evidently a useful apparatus for taking and conveying samples of gases. It is an advantage that the whole of the gas should be displaced from the connecting-tube. On the other hand, there are some defects about the apparatus. So far as one may judge from the drawing, a limited amount of agitation could be given to the laboratory vessel when charged with a sample of gas; but it does not give the facility for agitating the contents that is afforded by a Bunte burette. The withdrawal of a used reagent and the washing out of the cup *c* is rather inconvenient in the case of substances such as potash or fuming sulphuric acid. Indeed, for dealing with chemicals that are energetically acted upon by the air, such as potash pyrogallate or cuprous chloride, there is nothing like the Hempel bulbs, which

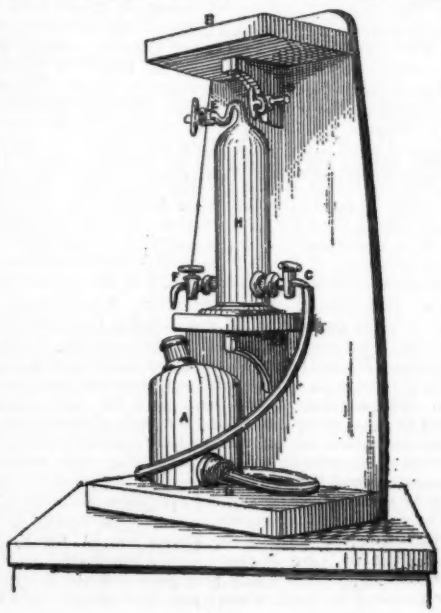


Fig. 2

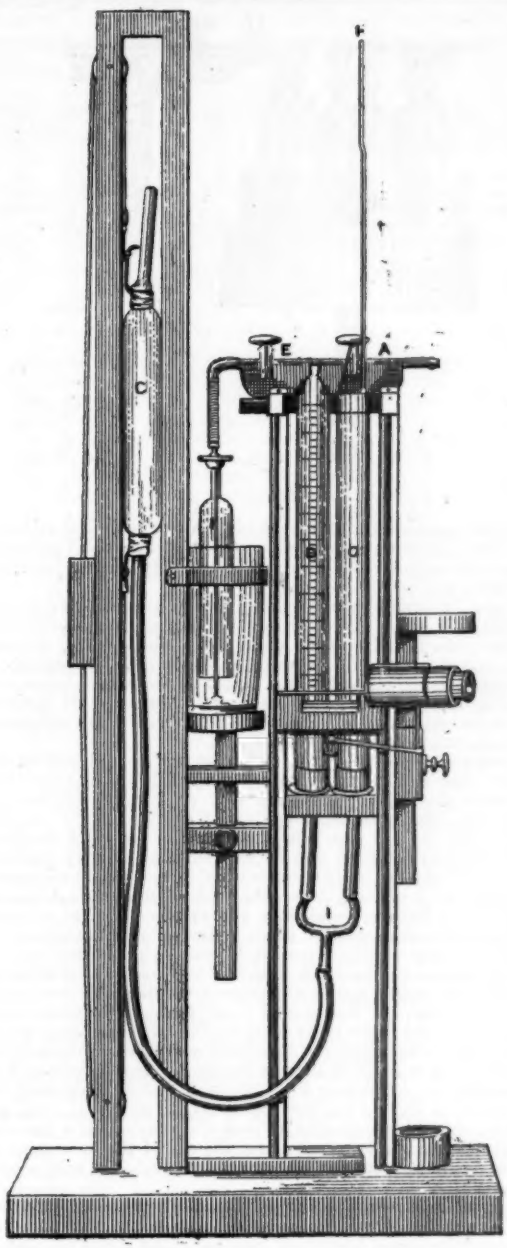


Fig 3.

are, however, subject to the objection that it is difficult to clear the capillary tubes and connections. So that with careful operation it is possible that more accurate results would be secured with the Wilson apparatus.

We now pass on to the second arrangement of gas analysis apparatus alluded to at the commencement. This is described in a paper recently read before the Newcastle Section of the Society of Chemical Industry by Mr. J. E. Stead, who stated that several times during the past ten years he had made communications to the Iron and Steel Institute, describing various forms of gas-testing apparatus which he had designed for the purpose of examining the gases from blast and other furnaces, and that it was his intention that evening to exhibit and explain the apparatus, which had undergone considerable improvement since attention was first drawn to it. Dealing first with the sampling of gases, he said that with gases that are constantly changing in composition, such as furnaces gases from solid fuel, it is impossible to obtain any average representative portion of the gas by simply drawing off a single pipette full by means of the old-fashioned pump. The old system used to be to take off several samples at different times, extending over a considerable period; to test each sample; and then to average the results obtained. M. Gruner had, he said, described a better method, by which a large vessel filled with mercury, and having a tap both at the top and at the bottom, was used to collect the sample. The upper end was connected with the flue or other source of gas supply, and a receiver placed below. By opening both taps, and adjusting the flow of mercury, regular portions of gas could be drawn in for a long period of time, and a fair average sample obtained in the vessel. He (the author) had

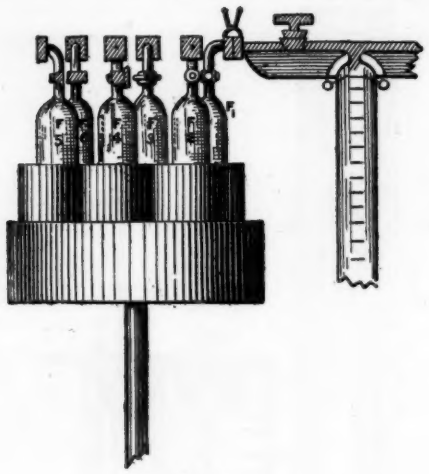


Fig 4.

designed a sampler on the same principle, also arranged to take the place of the old form of gas pipette. It was compact and portable, and could be enclosed in a case and left in any desired position; being self-acting when once started.

Mr. Stead's sampling vessel consists, as will be seen by fig. 2, of a gas receiver H, and a mercury bottle A. The receiver is furnished with two cocks E and D at the top, for the admission or exit of gases; and with two others F and C at the bottom, for mercury. The bottle A is connected to C and placed on the base G, when it is desired to draw in gas; or it is put on the upper shelf B when gas is to be sent out of A. The whole arrangement may be placed on the ground, or be hung on a wall.

In order to use it, A is filled with mercury, and placed on the shelf B. The cocks C and D are then opened, and the mercury flows down into H, displacing the air. As soon as this is completely done, the taps are closed, and A removed to G. A connection with the gas supply is then made by means of the limb E. E and D are opened, and suction supplied to D by suitable means, until any air in the connections is completely displaced. When this is done, D is closed, the neck of the bottle A placed under F, the latter opened, and the mercury allowed to flow into A at any desired speed. If the collection of the sample is to extend over any particular period of time, a graduated tube is used to receive the mercury from F. The contents of H being known, it is a simple matter to calculate whether the flow is too fast or too slow. If the sample is to be kept for some time before testing, the upper tubes must be filled with mercury, which can be done by inverting the apparatus and opening the taps for a moment. A portion of the sample can be readily passed into any burette, &c., by placing A on the upper shelf B, opening the tap D so as to allow a sufficient quantity to escape to clear out the tube, and connecting directly to the apparatus. If a gas containing dust, &c., is to be examined, the end of the tube inserted into the flue is covered with asbestos, and the asbestos with copper wire gauze.

Where there is reason to suspect that currents exist in the flue, and that a sample drawn from one side would not present a fair average of the whole, a long slit tube extending across the middle of the flue (or, better still, two such tubes at right angles, the gas being drawn off at the centre) is recommended. In operating on flue gases, the entrance of air at cracks, loosely-fitting damper-frames, &c., must be carefully guarded against, by plastering up all such openings with clay; and in all cases the intelligence of the operator must be directed to obtaining a fair average sample.

The original form of gas-testing apparatus is shown in fig. 3, and comprises a graduated eudiometer tube D, the upper end of which is joined at right angles to the capillary tube carrying the taps E and A. Platinum wires are fixed into the upper part of D in the usual manner, for producing explosions by means of an electric spark. A tube G, exactly similar in size and length to D, is placed close by its side. This is closed at the top by a cap, through which passes a small tube H, open to the atmosphere. Both tubes are narrowed at the bottom, and connected by means of the branch pipe I to the mercury reservoir C, which can be raised or lowered to any desired position by means of the cord running on pulleys and the counterbalance weight, and is held in place by grooved perpendicular guides. There is a single laboratory vessel F communicating with the eudiometer by means of the tube and tap E. A vessel containing water surrounds the tubes D and G; and, to secure accurate readings, a sliding spirit-level, carrying a telescope, travels on two perpendicular bars in front of the tubes. The sample of gas is admitted to D through the tap A; and the laboratory vessel F may be charged with potash to absorb carbonic acid. The use of the tube G is to maintain a regular pressure in D. When the mercury in both tubes is at equal levels (as may be ascertained with the help of the spirit-level), the contents of D are at atmospheric pressure. The water-jackets guard against variations of temperature in the course of an experiment. A bichromate battery and Ruhmkorff coil are used to produce the spark.

This form of apparatus could only be used for absorbing carbonic acid and for ignition. For instance, a sample of chimney gas having been drawn in through A, measured, passed over into F to absorb the carbonic acid, and returned to D, a sufficient quantity of pure hydrogen could be drawn in at A, the mixed gases ignited, and the proportion of free oxygen present calculated by observing the diminution in bulk which followed the ignition. So a second form was devised, which only differed from the first by having three absorbing vessels F, each connected to the horizontal tube by an independent tap. But this has been displaced in favour of the arrangement shown in fig. 4. Six laboratory vessels, numbered F1 to F6, are arranged on a turntable, so that every one of them can be readily connected to the horizontal tube and tap E (fig. 3) by means of the device shown on a larger scale in fig. 5. The horizontal tube, and also each of the tubes attached to the vessels F1 to F6, are furnished with perfectly flat solid pieces of plate glass, perforated in the centre, and firmly cemented to the ends of the tubes. The face of each plate being lightly smeared with olive oil, the horizontal tube can be readily connected with either of the laboratory vessels by means of the spring clamp shown in fig. 5.

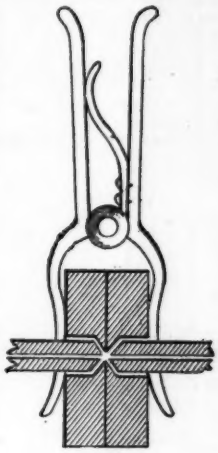


Fig. 5.

The latest form of Mr. Stead's gas-analysis apparatus is well suited for the examination of coal gas, especially if the laboratory vessels are so designed as to protect their contents from contact with the air. It is somewhat complicated in character, and therefore rather costly. The turntable arrangement admits of adaptation to many other forms of gas burettes, and is a most ingenious device for allowing any desired number of absorption vessels to be brought into contact with the gas-measuring tube. It lacks means for clearing out the capillary connecting tube; so that there would be a slight loss at each absorption, which could readily be estimated and allowed for. The laboratory vessels cannot be agitated while charged with gas, and therefore more time is required for the absorption of some of the constituents; but when separate vessels are employed for each reagent, this can be remedied by charging them with bundles of fine glass rods, or similar means for presenting a large surface, wetted with the reagent, to the gas. The glass plate and spring-clamp arrangement, by means of which a gas-tight connection between two tubes can be instantaneously effected, is also a very ingenious device, which is capable of application in connection with experimental gas apparatus generally.

Society of Engineers.—Members and friends of this Society will visit the East London Water-Works at Lea Bridge, Walthamstow, and Waltham Abbey next Thursday.

The New Railway Rates.—The *Pall Mall Gazette* of Saturday stated that the railway companies have decided to make and keep the new classification uniform; and the amendments they will propose to the traders in the interviews to be arranged will probably be agreed upon unitedly by the chief companies.

Proposed Transfer of Powers of Government Departments to County Councils.—The Local Government Board have introduced a Bill to confirm a Provisional Order under the Local Government Act, 1888, conferring upon County Councils certain powers heretofore exercised by the Home Office, the Board of Trade, and the Local Government Board. With regard to the two last-named departments, among the powers now exercised by them which it is proposed to delegate will be those in relation to gas and water supply conferred upon them by the Gas and Water Works Facilities Act, 1870, and the Amendment Act of 1873, the Public Health Act, 1875, and the Public Health (Water) Act, 1878. The various powers are fully set out in the schedules to the Bill; and the conditions under which they are to be taken over and exercised are specified. It is understood to be the intention of the Government to propose a reference of the Bill to a Hybrid Committee. The Order, if granted, is to take effect on Sept. 1 of the present year.

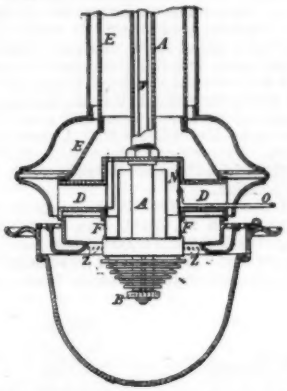
Proposed Electrical Standardizing Laboratory.—Last Wednesday a joint deputation of the London Chamber of Commerce and the Institution of Electrical Engineers had an interview with Sir Michael Hicks-Beach, at the offices of the Board of Trade, to urge the Government to establish an electrical standardizing laboratory. The deputation was introduced by Lord Rayleigh, who pointed out that every one taking a supply of electricity had a right to claim a meter, which was to be a certified instrument; and at present there were no means of obtaining such certificates. Sir. W. Thomson read the joint memorial of the London Chamber of Commerce and the Institution of Electrical Engineers; and concluded by remarking that unless they had instruments by which to test with accuracy, it would be impossible to carry out the Electric Lighting Act. Sir Michael Hicks-Beach said he thought the deputation had put before him very good reasons for such provision as was asked for being made; and he promised to bring the matter before the Treasury.

Register of Patents.

REGENERATIVE GAS-LAMPS.—Fullford, E., of Clapton, and Van Laun,; H. T., of Notting Hill, London. No. 7335; May 17, 1888. [8d.]

The object of this invention in regenerative gas-lamps is to allow of the introduction of a smaller central tube into and concentric with the ordinary gas-supply pipe; the lower end of this smaller pipe being connected with the burner, and its upper end (after being carried up to a sufficient height) being open.

In the illustration A is the gas-pipe, the lower end of which is closed; and V the smaller central pipe, the lower end of which communicates with the burner B; whilst the gas is admitted to its upper open end, either through the end or through lateral holes. In this way the gas in the central tube is kept cooler, and travels at a greater speed than when it passes along a larger tube; and it is less liable to deposit carbon in the pipe. The small tube V may be provided with an inner wire or cleaning device (not indicated in the drawing) attached to the burner, so that, by removing it, the wire can be used to clean and remove any deposit from the interior of the tube.



Another part of the invention relates to a method of closing the apertures through which the external air is admitted before being heated in its progress to the flame which it supplies. When it is required to light such a lamp, the gas is turned on to the supply-pipe A; and the lower glass globe below the flame is opened by releasing the hinged frame in which it is carried, for the purpose of lighting the gas, in doing which an explosion of greater or less force is likely to occur. By this improvement the external concentric tube or chamber of the regenerative chamber, and the chimney E attached to it, or the inner tube or chamber N, is made capable of turning laterally for a sufficient distance round the air tube or chamber F, through which air passes down to the burner. The external tube has a sufficient number (preferably three) of lateral passages D through it, which communicate with corresponding openings in the sides of the central air tube or chamber in one position of the latter—the spaces between the lateral passages being free for the passage of the heated air and products of combustion to the chimney; whilst, when the tube N is turned round to its other position, the inner ends of the lateral passages come opposite to the unperforated part of the inner air tube or chamber N, or preferably opposite to recesses in the tube or chamber open above as shown. In this way the air supply is diverted through them and through other openings into the chimney; whilst at the same time the perforations in the inner tube come opposite to openings into the spaces between the lateral passages through which the heated products of combustion or gas from the burner are diverted, so that they pass up through the chimney. In this position the glass may be sufficiently opened without danger of serious explosions in order to light the gas. O is a handle or lever by which the tube N is turned partly round as described.

MOTOR ENGINES OPERATED BY THE COMBUSTION OF EXPLOSIVE MIXTURES OF FLUIDS.—Hall, H. P., of Oldham. No. 10,494; July 20, 1888. [8d.]

This invention relates to improvements in the ignition mechanism of gas motor engines, more particularly those in which the explosive mixture is fired by a heated tube.

It is found, says the patentee, that when the engine is turning slowly round at starting, the valve admitting the explosive mixture in the cylinder to the igniting-tube should open when the crank is on the dead-centre, or very slightly before. But when the engine is running at or about full speed, the valve requires to be opened considerably sooner, in order to ignite the mixture at the commencement of the outward stroke of the piston. The present improvement consists in applying a mechanical device in such a way that it will control the time of opening the ignition-valve, and insure the ignition of the explosive charge at the proper time.

A suitable arrangement for this purpose (but which is described only by way of example) is to use two cams placed close together, one set a little in advance of the other. A bowl attached to the lever or other mechanism for working the firing-valve would be actuated by one or other of these cams. In starting, the bowl would be set so as to be acted on by the less advanced cam; and when the engine had attained its normal speed, the bowl would be moved so as to be acted upon by the more advanced cam—the change of position of the bowl being effected by hand. Instead of using two cams, a double cam might be used—*i.e.*, a cam with two projections placed in different planes, so that one or other projection might act upon the bowl as required.

ASCENSION-PIPES.—King, J., of Manchester. No. 14,878; Oct. 16, 1888. [8d.]

This invention refers to the trapping or collecting of the tar and ammoniacal or other liquors condensed in the ascension-pipes, and preventing them returning to the retorts; and consists essentially in constructing the ascension-pipes with a catch box or trap connected with each.

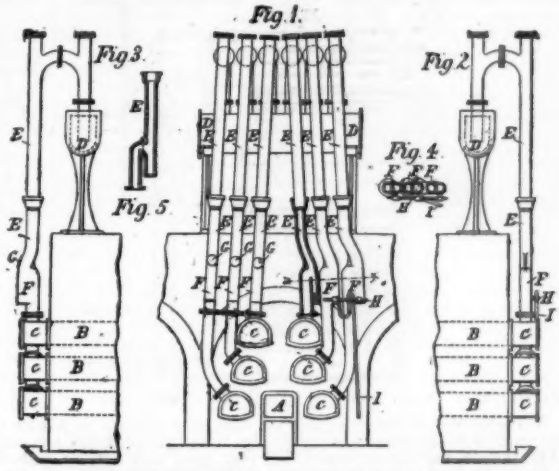


Fig. 1 is a front elevation (part in section) of gas furnace and retort, with ascension or outlet pipes made in accordance with the present invention. Fig. 2 is a side elevation of the ascension-pipes shown to the right hand of fig. 1; and fig. 3 a side elevation of the ascension-pipes to the left hand of fig. 1. Fig. 4 is a sectional plan of the ascension-pipes on the line *x*—*y* fig. 1.

The furnace A and retorts B may be of any ordinary construction, with the ascension-pipes leading from the mouthpieces C of the retorts to the hydraulic main D in the usual way. Each ascension-pipe E is constructed with a trap or catch-box F, placed as near as practicable to the mouthpiece of its retort. The trap it is preferred to make as shown in the drawing, with a well or receptacle at one side of the pipe; the upper walls of the pipe being bent or curved so as to project over the well. The lower part of the ascension-pipe connects with the upper part at such an angle that any liquor condensing upon, and running down the upper walls will flow into the well. The three ascension-pipes shown to the right of fig. 1, and in figs. 2 and 4, have the traps F placed with their wells at the side of the pipes; and the three pipes to the left of figs. 1 and 3 have the traps F placed with their wells in front. G is a door, through which, if needful, the pipes may be cleaned.

It is evident that the trap may be arranged in any other convenient manner—such as by forming the pipe in two lengths, and joining the lower length to the side of the upper one as in fig. 5, leaving a well at the base of the upper pipe. Or a trap may be formed on one ascension-pipe, into which all the retorts may be discharged by means of a short bent pipe or other connection. The wells of the several traps are preferably connected together by a pipe H, to which is connected a draw-off pipe I, fitted with a syphon or valve to prevent the passage of air into, or the escape of gas from the ascension-pipes. The liquors that condense in the ascension-pipes will fall down the sides of the pipe, and collect in the well, from which they are drawn off by the pipe I, into any receptacle, placed for the purpose.

ENRICHING AND PURIFYING THE FLAME OF COAL GAS.—Spong, J. O., of High Holborn, London. No. 2664; Feb. 14, 1889. [8d.]

This invention relates to apparatus attachable to, or forming part of, an ordinary gas bracket, gaselier, or the like, and charged with paraffin or other heavy oil; or it may be a light oil and with a tube containing a wick provided with a button for adjusting the wick, and so regulating the height and spread of the gas-flame. The wick-tube is preferably flat and of curved formation, so that its end approaches the flame; a portion of the wick being within the gas-flame and burning therewith, which not only increases the size of the gas-flame (says the patentee), but enriches the light and produces greater purity—"the edge of the flame being particularly steady and regular."

MANUFACTURING GAS.—Averell, J. D., of Brooklyn, U.S.A. No. 2914; Feb. 19, 1889. [8d.]

This patent is for a wood-gas generating apparatus; and the principal claim for the invention is: "The process for manufacturing wood gas and its residuum, which consists in first charging an imperforated cartridge with wood; then inserting the cartridge in a closed horizontal retort, which is highly heated; then admitting steam into the retort and cartridge for disentegrating and softening the wood, for more effectually extracting the gases therefrom; then superheating and fixing the gases by passing them to and through the rear open end of the cartridge, and from there forward between the cartridge and the wall of the retort; and finally, after the gases are extracted from the charge, to open the retort and extract the cartridge—quickly sealing its open end and smothering the residuum while closed from the air."

GAS GRILLING APPARATUS.—Brophy, M. M., of High Holborn, London. No. 6605; April 17, 1889. [6d.]

This invention relates to apparatus for grilling by means of gas; and it has for its object to provide simple and efficient means for adjusting the position of the grill relatively to the gas-flames, and to provide means for altering the angle of the grill, so that the substance being grilled can be subjected to more or less heat at any required part.

GAS-GRILL.—Main, R. B. and A. P., of Glasgow. No. 5964; April 8, 1889. [6d.]

This invention relates to gas-heating apparatus for grilling, boiling, and toasting, and the improvements have for their object to render such apparatus more readily convertible from the form in which it is adapted for heating cooking utensils or other articles placed over it to the form

in which it is better adapted for radiating downwards the heat generated by the combustion of gas and effecting such cooking operations as grilling or toasting.

Fig. 1.

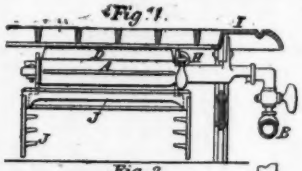
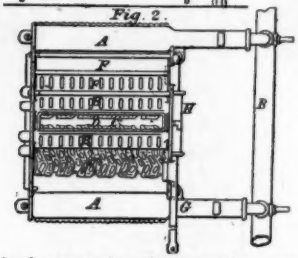


Fig. 2.



As represented in the engraving, the apparatus consists of a pair of gas-burners A, connected to a supply-pipe B, and provided with a number of jet orifices, the flames from which play upon iron frets or grids C, formed with knobs or projections for retaining and radiating heat, whilst the products of combustion pass up mainly through a central funnel D formed in a hot plate E over the frets. The hot plate E is grated or formed with orifices, through which such portions of the gases as do not reach the funnel D may pass upwards; and on each side of the funnel, pivotted flaps or doors F are fitted to constitute, when closed, part of the hot plate E, which serves to guide the flame and radiate downwards the heat of the gas upon food placed in a tray or other dish J below to be toasted or boiled. The doors or flaps F are pivotted, so that they may be tilted up to form supplementary funnels or openings for the upward passage of the gas-flame, when it is desired to use the apparatus for boiling and grilling over the fire. The opening and closing of the doors or flaps F is effected by a rod G provided with a handle, and having formed on it at points immediately under the ends of the doors projecting lever arms, which are fitted to tilt open the doors or flaps or lower them according as the rod is turned to the right or left. The rod G is fitted in a bush H, in which it is free to turn and slide to an extent which is limited by a stop pin passing through a slot in the bush; the slot having in it a notch to engage the pin, and prevent the rod G turning and the door closing after operating the device to open them.

APPLICATIONS FOR LETTERS PATENT.

9619.—Hatton, G., and Harboard, F. W., "Improvements in the manufacture of water gas, and in apparatus for its production and use." June 11.

9621.—Aitken, H., "Improvements in making gas from coal or other bituminous or combustible substances." June 11.

9625.—Miles, C. E., "Improvement sin the production of illuminating gas." June 11.

9626.—Miles, C. E., "Improved means and apparatus for the manufacture of producer or generator gas." June 11.

9635.—Hearne, J., "Improvements in gas-meters." June 11.

9685.—Hunt, E., and Howden, J., "Improvements in motors actuated by combustible gas or vapour." June 12.

9769.—Lake, H. H., "Improvements in gas-pressure regulators." (A communication from P. Noyes.) June 13.

9783.—Neilson, A., and Black, W., "Improvements in distilling shale, coal, or other oil and tar-yielding minerals, and in retorts therefor." June 14.

9833.—Roots, J., "Improvements in gas-engines." June 15.

9847.—Williamson, T., "Improvements in reversing valves in flues for gas and other furnaces." June 15.

New Retort-Settings at Longwood.—The tender of Mr. J. Walsh, of Halifax, has been accepted by the Longwood Gas Company, for building a new stack of 14 arches and setting 14 beds of retorts on the Dinsmore principle, under the supervision of Mr. Neil Meiklejohn, the Engineer of the works.

The Danger of Oil-Lamps.—On the night of Saturday, the 15th inst., a fire broke out on the premises of Mr. A. A. Mummery, cabinet maker and upholsterer, of Barnet, which resulted in their destruction. Just before the discovery of the outbreak, a crash was heard in the shop; and it was found that a "safety" oil-lamp, by which the place had been lighted, had become detached from the beam from which it had hung, and had fallen to the ground—the ignited oil running under a side table and among the furniture, which was in flames. No gas had been used on the premises for several months. It is supposed that the flame may have been turned up too high, causing the over-heating of the match-boarding of the ceiling, and the dislodging of the fastening of the lamp. The flames spread so rapidly that the inmates had barely time to escape; and the proprietor has lost absolutely everything.

The London County Council and Electric Lighting.—At the meeting of the London County Council last Tuesday, the Chairman (Lord Rosebery) stated that a letter had been received from the Board of Trade, thanking the Council for the assistance they had given in the matter of electric lighting, and sending a copy of a Model Order proposed to be followed in the case of all the electric lighting applications now before the Board. This letter would be reported upon by the Highways Committee, probably at the next meeting of the Council. In the meantime, the Board of Trade stated that if the Council wished to bring any points in the Order under the notice of the Board, they would be glad to see representatives of the Council, and to discuss such points with them. Perhaps the Council would authorize the Highways Committee, if they should think necessary, to depute some representatives to confer with the Board of Trade, and to suggest, on behalf of the Council, any alteration they might think desirable. The Council empowered the Highways Committee to act accordingly.

Correspondence.

[*We are not responsible for the opinions expressed by Correspondents.*]

THE GAS CONSUMERS OF MANCHESTER.

Sir,—When I saw my last letter [*ante*, p. 1133] in print, my conscience accused me of being too severe on the aldermen. I apologize, with the qualifying remark that it takes a trenchant weapon to penetrate the aldermanic hide. I admit that I was equally hard on the gas consumers; but, then, as every one knows, it needs a red-hot poker to make Pantaloon jump. In the concrete, both aldermen and consumers are deaf to the music of the spheres, else I should have addressed them in dulcet strains.

And now, having made the *amende honourable*, I turn to the main question. A correspondent in the newspapers, under the cognomen of "A Gas Consumer," kisses the rod with which he is smitten by the Gas Committee, and, with true Pecksniffian humility, defends, or tries to defend, the action of the majority of the Council in their administration of the gas finances. I was once present at an election meeting where the candidate, a landowner, was addressing his tenantry with a view to securing their votes. After enumerating all that he had done for them in the way of improvements, he put the question: "And now, my friends, have I not been good to you?" "Far too good!" was the response that came from one of them, who was evidently trying to curry favour with the great man. "A Gas Consumer" I would take to be one of like kidney with the more-than-satisfied tenant, if it were not that the cloven hoof of the alderman is visible beneath the consumer's cloak.

I am not, however, to be turned from the scent by any red-herring drawn across the trail. Every figure that I gave in my last letter is substantially correct. I have made the assertion that gas could be sold in Manchester at the price of 2s. per 1000 cubic feet; and I now proceed to make good that position.

The quantity of gas transmitted from the works of the Corporation for the year ended March 31, 1889, was 3,108,269,000 cubic feet; measured and accounted, 2,932,959,000 cubic feet; loss, 175,310,000 cubic feet, or 5·64 per cent. The cost of production and distribution, with all office and collecting expenses, was as follows:—

	Amount. £		Cost of Gas Accounted for per 1000 c. ft. s. d.
Coal and cannel	184,773	..	1 3·12
Less residual products	67,855	..	5·55
	116,918	..	9·57
Working expenses, including Wages, salaries, purifying materials, repairs and maintenance, rents, rates, and taxes, stationery and printing, miscellaneous payments, and bad debts	129,606	..	10·61
	246,524		1 8·18
Interest on loans, &c.	28,403	..	2·32
Sinking fund	26,454	..	2·16
	301,381	..	2 0·66
Less meter, stove, and cottage rents, interest received, and miscellaneous receipts	12,380	..	1·01
	289,001	=	1 11·65

Thus proving my contention that after providing for interest on loans, &c., and an unnecessarily heavy amount by way of sinking fund, the gas might safely be sold at the price of 2s. per 1000 cubic feet.

I will not at present go into the further question, and show, as I can easily do, that the cost of collection is grossly excessive, and that fully £15,000 is being lost to the city annually owing to the persistent neglect of the Committee to work up the ammoniacal liquor into sulphate of ammonia. The economies that could readily be effected in these directions would reduce the cost of the gas to 1s. 10d. per 1000 cubic feet—always remembering that in this figure is included the charge for interest and sinking fund.

If, after the statement of these facts, the consumers continue to maintain their apparently apathetic and indifferent attitude, they can scarcely expect their representatives in the City Council to strive with any enthusiasm in their behalf.

Mr. Alderman Walton Smith, and Mr. Councillor Southern, the mover and seconder of the resolution to dispense with the depreciation fund, and their twenty-one supporters on the Council, are to be congratulated on their effort at the last Council meeting to remedy a glaring abuse. They were convincing in their arguments, and their demand was reasonable enough, in all conscience. They might have gone further, and cut at the root of the other abuses practised by the Gas Committee; but probably they thought it best to advance one step at a time, and deal with the abuses piecemeal. They will fail, however, in their laudable efforts until they have awakened public opinion on the question. Let them take a further step; let them go to the public and their constituents, and submit their views in public meeting assembled. Until they are supported by an awakened and active public opinion, they will not succeed in their efforts to place the financial conduct of the gas undertaking on a fair basis.

Why a citizen who happens also to be a gas consumer should be called upon to contribute more to the rates than one who does not consume gas, I am utterly at a loss to know. The consumers will never be relieved—and they scarcely deserve to be relieved—from this unjust system of double taxation, unless they offer an active support to their friends on the City Council.

The question is one that concerns not only the gas consumers, but the general body of ratepayers. As a matter of fact, the carrying of these large sums to "aid the rates" does not reduce the rates at all. Their effect is to encourage waste and extravagance and corruption. There would be greater economy in municipal administration if the municipal rates were levied direct, and the iniquitous system of overtaxing a part of the community by indirect methods were abandoned.

T. N.

Manchester, June 21, 1889.

THE EDUCATION OF GAS ENGINEERS.

SIR,—Referring to your leader on the above subject in the last issue of the JOURNAL, I should like to be permitted to say a few words bearing on the subject.

The primary object to induce young men to practise and study for, and make themselves proficient in, any profession is a fair certainty of obtaining a reasonable remuneration for their services when they have proved themselves to be worth it; and the question which has so often been mentioned by you—viz., the policy of parsimonious gas-works-owning corporations (and, I venture to add, companies too) which do not offer a prospect of reasonable remuneration for trained and educated gas engineers, is doing much to prevent young men, otherwise suitable, from entering the profession.

This question leads to another, which I consider deserves an equal share of attention, and is important as bearing on the previous one—viz., the pay and position of gas engineers' (qualified) assistants. As the future of the industry depends upon the rising generation of assistants, it is only fair and right that the remuneration awarded them should be such as to encourage them to push forward, and to compensate for the time and expense they are put to in pursuit of the various studies which it is essential they should follow. And it is now acknowledged on all sides that, to be a successful gas engineer, one of the most important preludes is to have a thorough knowledge of mechanical and constructive engineering, which really means an apprenticeship to a firm of manufacturing engineers previous to entering a gas-works. In addition to which they must have a good knowledge of building construction, chemistry, and many other kindred sciences, saying nothing about that one essential to all vocations—common sense.

Judging from the number of applications for every berth that is advertised, I should think there is a very large class of qualified, yet underpaid, officials in the several gas undertakings in the United Kingdom who are ever ready to offer their services at a very much cheaper rate than an engineer of any standing could afford to; the consequence being that, in many cases the cheaper man (yet qualified, but not so fortunate) is appointed, and altogether does very well out of it, as in most cases the salary is in advance of his previous one, and whereas before he was at a standstill, he how has the opportunity of advancement according to his worth.

This, I think, is one of the chief causes of the small salaries offered by many corporations and companies, they knowing full well that there will be plenty of suitable men to choose from; and the younger members of the profession accept these berths out of sheer necessity, it being too late for them to think of changing into any other vocation. In this way a general reduction all round will ensue, and the present high standard of efficiency decline.

If the present standard is to be maintained, and the interests of the gas industry advanced, without doubt better remuneration will have to be offered than is the case at present, if the right class of young men are to be encouraged to enter or remain in the profession. As now, after serving four or five years in an engineer's shop and about the same time in a gas-works, a young fellow is fortunate indeed if he commands the pay of an ordinary bankers' clerk, who requires no special training and study and has no concern with his business when clear of the premises.

Gas companies and corporations are not poor, and for their own interests should grant fair and reasonable remuneration, not only to heads of departments, but to those who they will require and depend upon in the future.

ASSISTANT ENGINEER.

June 19, 1889.

THE CONTINUOUS DISTILLATION OF TAR.

SIR,—Noticing in your issue of the 11th inst. (p. 1087) that Mr. F. Lennard has taken out a patent for the continuous distillation of tar, I beg to say that I worked this identical system on a small scale nearly ten years ago. Mr. Koe, of Messrs. John Bethell and Co., knew of it; and it was worked by a man, more than eight years out of my employment, openly in our works, as my foreman and the older workmen can testify. For pecuniary and other reasons I did not then work this plan on a larger scale; but would have done so three years ago had I not got another tar plant very cheap. Besides, the necessity for working promptly did not give me time to have a larger apparatus made on the above system. My small apparatus (made by Mr. J. Donfield, of Dublin) is still here, and anyone interested in the matter can easily verify my statements.

JOHN STOER.

Dublin, June 20, 1889.

THE USE OF STOPCOCKS.

SIR,—We observe in your issue of the 18th inst. (p. 1135) a letter from "Night Inspector," on the stopcock question. His objection, that people may "put their walking sticks in the stopcock box and fall down," does not apply to a properly made stopcock box (which should have no hole in it making this possible), though it applies strongly to most coal-plates which ought evidently to be at once done away with. His other objection, as to "blind men falling over workmen engaged in repairing stopcocks (!)" applies equally to men engaged in laying or repairing anything and everything. All workmen and repairs should therefore also be done away with.

We are glad to see the objections to stopcocks reducing themselves to such small proportions. It is practically admitted on all hands that stopcocks to each service should exist in every supply, quite apart from any Deacon meter system. To show that they are not a necessity of this system, we may quote the town of Leamington. The supply was formerly about 24 gallons per head per day. Deacon meters were adopted; and the total supply has now come down to 15·1 gallons per head per day (April, 1889), which includes not only domestic and sanitary, but also a small trade supply. This is one of the best results obtained anywhere, considering the class of town; *and has been obtained without stopcocks.* Excellent results were also obtained in the town mentioned by "Night Inspector" (Portsmouth) before placing the stopcocks. But the latter are an evident advantage, for the wasteful premises are then detected from the outside, and being for the moment shut off, the meter records how much of the total waste has been thus localized by the inspector, and now much has escaped detection and been left on the district.

Stopcocks are thus a great boon to both the water-works proprietors and the inhabitants, saving the latter from the annoyance of unnecessary visits. But where they do *not* exist, the Deacon meter is still more needed; for without it the water-works proprietors are completely in the dark as to what becomes of their water. Does any one run a valuable steam-engine without owning, and using, an indicator?

WASTE WATER-METER COMPANY, LIMITED.

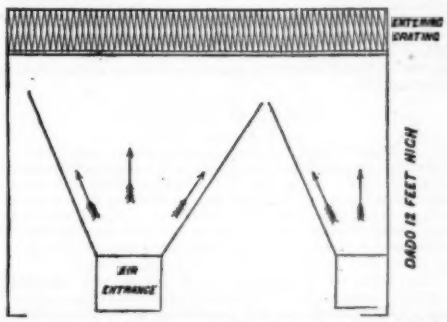
Liverpool, June 19, 1889.

THE SCIENCE OF VENTILATION AS APPLIED TO THE INTERIOR OF BUILDINGS.

SIR,—The introducer of any new system must be prepared to be misinterpreted and misunderstood to some extent at the outset, and to receive with equanimity any knocks of which his position makes him the recipient; and your hit about my unpleasant pretension of coming to London from Glasgow to instruct an ignorant universe is good enough in its way, and may be passed by philosophically. But with reference to the statement that the system applied to the theatre of the Society of Arts is undistinguishable from mine [*ante*, p. 1082], it is clearly proper that I should show that any supposed identity between that system and mine is superficial and not real; and to state, shortly but clearly, what are the main fundamental and essential differences, both in construction and results, between the apparatus set up by Mr. Robins and my apparatus.

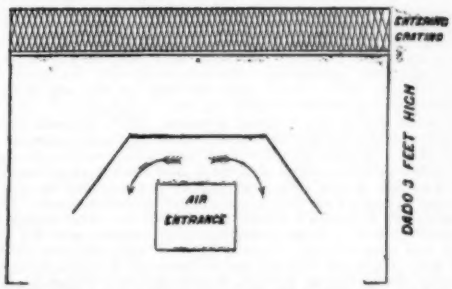
Mr. Robins aims at, and attains a wider distribution of the entering air than is usual—viz., along the whole length of the north wall; but his corrollary, that it is so generally diffused without draught, is inaccurate, as I will show. I have aimed at the imperceptible diffusion of the entering air in that part of the room where it immediately yields its oxygen, uncontaminated, for the inhalation of the occupants, and have succeeded in attaining this for the first time.

The internal fittings within Mr. Robins's dado are expressly designed to assist the entering air to travel along swiftly by an arrangement for conducting it up to the grating by which it enters the room, without let or hindrance, thus—



So that the air travels directly upwards, without any break in its initial velocity of entrance from without.

My fittings are the exact reverse, expressly designed to resist and prevent the free and rapid passage upwards of the entering air, which must enter the dado reservoir "in a lateral direction," and wholly deprived of its initial velocity of entrance from without, thus—



This is very clearly shown in the model exhibited at the reading of my paper before the Society, and now lying in Exeter Hall for exhibition to the Trustees.

Mr. Robins introduces the entering air into the room at the top of a dado 12 feet high, through a grating at which it arrives with all possible velocity conserved, as already explained. I introduce it at the height of 3 feet, out of a dado reservoir, throughout which it has spread, deprived of its velocity, whence it perlocates through the top grating, and permeates the atmosphere of the room, at that low level, by imperceptible diffusion.

The effect on the atmosphere at the levels respectively of 3 feet and 12 feet from the floor, is somewhat similar, except for the greater movement within Mr. Robins's dado, led up to the point of exit into the room, which must, in certain states of the wind, cause a sensible current, or series of currents; whilst the air entering through the grating on the top of the 3-feet dado without velocity gently mixes with the coolest and best air already in the room at that low level, yielding its oxygen, uncontaminated, for the breathing of the occupants. On the other hand, air introduced 12 feet up does not find there the coolest and best air in the room, but air both raised in temperature and more or less contaminated by the products of respiration, exhalation, heating, &c. If the entering air be of the same temperature, it will become diffused at that level, but can never descend to the floor; if, on the other hand, it is cool enough to descend to the floor level, it will fall on the heads and shoulders of the occupants—thus not only giving rise to descending draughts, but to draughts which are not pure, because the cool entering air, in its descent, cools and brings down with it some of the impure warm air it encounters at the high level.

The two fundamental and essential elements in my system of intro

ducing the air—(1) at a low level, to keep up a continuous supply, uncontaminated, for the occupants, and (2) with the velocity of the entering current neutralized by appropriate apparatus—are entirely wanting in the appliances fitted up in the hall of the Society of Arts.

The like objections apply to the outlet apparatus. It has, *inter alia*, the following radical defects:—(1) Deficiency in free sectional area of outlet from the hall, with obstacles to the rapid passage of the air; (2) a modified foul-air chamber around the cupola; (3) the heat applied erroneously at the top instead of at the bottom of the upright shaft; (4) absence of insulation to prevent condensation outside. It is not doing one-fourth part of the effective work which the removal of these defects would render it capable of accomplishing.

I have offered, and am prepared to put all these averments to the test in the most practical manner. I will undertake to alter the inlet and outlet ventilation of the hall to my system, under the onerous conditions that a careful observation and report on the state of its atmosphere at the last stage of a crowded meeting is to be made by an expert before I commence the changes, and again after they are completed; and that I am to be reimbursed my expenses and paid my charges only upon the expert reporting a result which proves that a manifest and unquestionable improvement has been effected.

The system is applicable, and has been successfully applied, to every variety of interior.

Glasgow, June 17, 1889. D. G. HOEY.

Parliamentary Intelligence.

HOUSE OF LORDS.

The following further progress was made with Bills during the past week:—

Bills read the first time; East Kent District Water Bill, Garw Water Bill, Swansea Corporation Water Bill.

Bills read a second time: East Kent District Water Bill, Swansea Corporation Bill.

Bills committed:—Gas and Water Orders Confirmation Bill (Marlow Order opposed), Liverpool Corporation Bill, Woodhall Spa Company Bill.

Bills read a third time, and passed: Belfast Water Bill, Bury Corporation Bill.

HOUSE OF COMMONS.

TUESDAY, JUNE 18.

THE VYRNWY RESERVOIR EMBANKMENTS.

Mr. S. LEIGHTON asked the President of the Board of Trade whether, in view of the gigantic character of the water-works and reservoirs now being constructed by the Liverpool Corporation in Montgomeryshire and at Oswestry, and of the dangers to which the inhabitants of the district will be exposed should the stone dam or earthern embankments give way, the Government will make such provision for an independent inspection of the works as will satisfy the public of their sufficiency.

Sir M. HICKS-BEACH: The Board of Trade have no statutory power to make any such inspection as is suggested. But if the parties interested in the reservoirs desired such an inspection, I would endeavour to see if arrangements could be made for the purpose. I may say that in 1886 Sir Andrew Clarke, C.B., R.E., visited Vyrnwy, and reported that, in his opinion, the building of the wall was being well and skilfully carried out, and that the section was so enormously in excess of actual requirements, as evidenced by comparison with other existing masonry dams, that nothing short of an earthquake could possibly disturb it.

WEDNESDAY, JUNE 19.

COAL DUTIES (LONDON) ABOLITION BILL.

Mr. W. H. SMITH moved—"That the motions relating to the Coal Duties (London) Abolition Bill may be taken this day, at any hour, though opposed, and the proceedings thereon shall not be interrupted at half-past five or six o'clock. But as soon as the said motions, and any subsequent unopposed business, are disposed of, the Speaker shall adjourn the House without question put." He said the Government had had some hope that the motion of the honourable Baronet opposite (Sir J. Pease) would have been reached on the previous night before twelve o'clock; but as this hope had been disappointed, he (Mr. Smith) had felt it his duty, looking to the urgency of the matter, to place on the paper for that morning the present motion. The Bill to which it related was read a second time before the Whitsuntide holidays (*ante*, p. 1002), after a short and interesting debate; and the Chairman of Ways and Means having pointed out the inconvenience of reading a Bill of this character without examination by a properly constituted Committee of the House, he (Mr. Smith) and the Home Secretary, on behalf of the Government, had agreed that the Bill should be read a second time on the distinct understanding, to which the honourable Baronet acceded, that it should be referred to the usual Hybrid Committee. The Government now asked the House to afford the requisite facilities for such a consideration of the Bill. To be effective the Bill must pass the House before the end of the first week in July; if not, rights might be exercised that would perhaps be materially injurious to the whole of the Metropolis.

Mr. STUART opposed the motion, because he felt that the House ought not to be called on to deal with the matter in the hurried manner proposed, and to pass a resolution whereby the City of London would practically be enabled for a certain number of years to levy a rate on the whole Metropolis. If the Corporation had liabilities to meet, let them be met by a rate within the City area.

Several other members also opposed the motion.

Sir J. PEASE said that when the Bill passed the second reading stage by a large majority, he entered into stipulations with the First Lord of the Treasury in almost the words dictated by the Chairman of Ways and Means. It was not until a late hour on the previous evening that he received a message from the right honourable gentleman stating that he would afford facilities for discussing the measure in the manner now provided by the motion. The question was one which deserved the early consideration of the House; and this was the reason why he urged honourable members to accept the motion. On the 5th of July next the old City privileges would revive. On that day the City would have the privilege of levying 8d. per ton on all the coals brought into the Thames, and to some extent on railway-borne coal. The greatest possible confusion existed in the coal trade in London at present, because dealers would not make contracts owing to the uncertainty which prevailed. This question was so mixed up with the whole trade of the Metropolis and the North of England and the Midland counties, that it behoved the House to take the earliest possible opportunity to remedy a state of things which tended to produce utter confusion in an important branch of industry.

Mr. COURTNEY said the opposition to the reference was a violation of the understanding on which the Bill was read a second time, since it followed, almost as a matter of course upon what was done at the second reading, that the Committee should inquire into the moral right of the City to levy these dues. He could not see that it would be inconsistent with the duty of the Metropolitan members who were opposed to the coal dues to let this matter go forward without discussion. At all events, the time between now and July 6 was so short that it was absolutely necessary to proceed with the matter at once.

After some further discussion,

Mr. A. O'CONNOR moved the adjournment of the debate.

On a division, this proposition was rejected, and the original motion carried by 115 votes to 63.

At a later stage of the proceedings,

Sir J. PEASE moved that the Committee on the Bill should consist of seven members—four to be appointed by the House, and three by the Committee of Selection; and that Sir Richard Temple, Sir Bernhard Samuelson, Mr. Lawson, and Mr. Baumann be appointed members of the Committee.

This was agreed to without discussion,

Sir J. PEASE then moved:—"That it be an instruction to the Committee that they have power to inquire into the amount and character of any duties in respect of costs which would accrue to the Corporation of the City of London on the expiration of the Coal and Wine Duties Continuance Act, 1868, under the provisions contained in 1 & 2 Will. 4, cap. 76, and any subsequent Acts of Parliament; the manner in which the 4d. per ton allocated to the Corporation of the City of London by statute for the Holborn Valley improvements has been expended; how far any sums of money that were borrowed from the Holborn Valley improvements still remain unpaid; and whether, in consequence of the abolition of the said duties, there should be any, and, if so, what provision made in the Bill in respect of such debt, if any, existing on the primary security of such duties." He said that in moving this instruction he was carrying out the suggestions which at the time of the second reading of the Bill were thrown out by the Chairman of Ways and Means. He desired that the Bill should pass with the least possible delay, as the present position of affairs was highly detrimental to the trade of the Metropolis.

Mr. PICKERSGILL moved, as an amendment to the motion for an instruction to the Committee, to leave out all the words after "any subsequent Acts of Parliament." He agreed with the honourable Baronet that the Bill should be referred to a Committee; but he objected to the terms of the reference as being irrelevant to the present purpose, and as re-opening a question which had already been decided by the people of the Metropolis, acting through their accredited representatives, the County Council for London. His amendment would not preclude the Corporation of London, by their Counsel, from putting forward any legal claim, and having it considered and reported on by the Committee, and at the proper time inquiry into the mode in which the Corporation had expended money in connection with this matter would meet with his warm approval; but he protested against the proposed instruction to the Committee on the grounds he had already indicated. The question of the taxation of Metropolitan coal had been repeatedly raised during the last five or six years; and Governments of both parties had been asked to pronounce upon it. But the invariable answer had been that it was not for them to decide the matter—they must wait until it could be considered by a properly constituted Metropolitan representative body. This body had now been called into existence, and it had given its decision; and on this he rested his case. Not only was it proposed to re-open this question, but the proposal of the Chairman of Ways and Means wanted also to submit to the Hybrid Committee that was to be appointed the consideration of the moral as well as the legal claims of the Corporation of London—a reference against which he (Mr. Pickersgill) entered his strongest protest.

Mr. FIRTH said a curious transformation had come over the attitude of the Corporation of London towards the Bill. On the second reading they opposed it vehemently, but now they had no desire to block the Bill; and he was driven to the conclusion that it was all due to the form in which the instruction was moved. It was sought by this means to re-impose a statutory coal duty, which all parties and all Governments had condemned for 15 years. The London County Council would not be entitled to representation before the Committee; and if this measure was passed, it was only the City that would derive any benefit from it, while the inhabitants of London generally would only have to pay.

Mr. ROWLANDS said to attempt to say anything in favour of the existence of the coal dues seemed to be absurd when the parliamentary proceedings were looked through. It was hoped that by the 5th of next month the dues would have been no more; and he protested against the attempt to continue burdening the people with them. He desired to record his strongest opposition to the reference.

On a division, the amendment was rejected by 101 votes to 46; the original motion being subsequently agreed to without a division.

THURSDAY, JUNE 20.

STOKERS IN THE ROYAL ARSENAL GAS-WORKS.

Mr. CUNINGHAME GRAHAM gave notice that on Monday, June 24, he would ask the Secretary of State for War whether he was aware that the stokers in the Royal Arsenal Gas Factory work on an average 81 hours per week, and receive pay at the rate of 5d. an hour, whether in the day or night; that they have to wheel their coke in the open air for a distance of 50 yards in all weather, while in a very high state of perspiration; that the lobby in which the men have to change their clothes and take their meals has an open cesspool in the corner, is insufficiently ventilated, and often filled with sulphurous fumes; and whether he will take steps to reduce the hours that the men have to work at this exhausting labour to eight per day, to have a covered way erected for their protection when wheeling, and to have a new and properly ventilated lobby built, wherein the men can take their meals.

THE SAFETY OF ARTIFICIAL DAMS.

Colonel NOLAN gave notice that on Monday, June 24, he would move for a return of the areas in Great Britain and Ireland which would be flooded so as to seriously endanger human life by the bursting of any artificial dam.

FRIDAY, JUNE 21.

THE SAFETY OF ARTIFICIAL DAMS.

Colonel NOLAN asked the President of the Local Government Board whether there were several districts in Great Britain and Ireland in which there would be considerable danger to life if the artificial dams which restrain reservoirs, lakes, or rivers were to burst; whether the Local Government Board were in possession of any information as to the areas of some of such districts; and, if so, had he any objection to furnish a return on the subject. In case the Local Government Board were not provided with such information, was it the duty of any local body to be

in possession of statistics on the subject; and, if so, would he specify what local bodies should satisfy themselves on that head.

Mr. LONG: The Local Government Board have no definite information on the subject of this question; but there can, I think, be no doubt that there are in England artificial dams which restrain reservoirs, lakes, or rivers, and which, assuming that they were to burst, would be attended with danger to life. The Board are not in possession of any information as to the areas which, in the event of such bursting, would be affected. No doubt the areas which would be so affected would necessarily depend very much on the circumstances at the particular time, as, for instance, whether the rivers were in flood or otherwise. I cannot say that it is the duty of any local body to be in possession of statistics on the subject; but, of course, it devolves on the local authority in whom the reservoir may be vested to take such measures as may be requisite for securing its stability. I may observe, with respect to reservoirs provided by any local authorities under the Public Health Act, that due notice has to be given in the local newspapers of any proposal to construct reservoirs with a capacity exceeding 100,000 gallons; and, in the event of objection, the works cannot be proceeded with until after local inquiry by the Local Government Board. I may also draw attention to the provisions contained in the Water-Works Clauses Act, 1863, which have almost invariably been incorporated in Local Acts passed since that date for the construction of reservoirs, either by municipal authorities or by water companies. [The honourable gentleman read sections 3 and 4 of the Act.] There are also provisions for the Justices requiring the necessary works to be done when they are satisfied that there is cause for complaint, although the reservoir is not in an imminently dangerous state.

Colonel NOLAN asked if nobody, local or otherwise, was in possession of the information as to the districts which are affected by these works.

Mr. LONG: That is so.

THE LONDON COUNTY COUNCIL AND WATER SUPPLY.

Mr. FIRTH gave notice that on Monday, June 24, he would move for leave to bring in a Bill to confer powers upon the London County Council with respect to the supply of water.

The following further progress was made with Bills during the past week:—

Bills read the first time: Belfast Water Bill, Bury Corporation Bill.

Bills read a second time, and committed: Gas Provisional Orders Bill, Water Provisional Orders Bill.

Bills reported: Padiham and Hapton Local Board Bill, Wakefield Corporation Bill.

Bills read the third time, and passed: Coventry Corporation Water Bill, East Kent District Water Bill, Garw Water Bill, Manchester Corporation Bill, Newcastle and Gateshead Water Bill, Windermere District Gas and Water Bill.

THE DINSMORE PROCESS AT WIDNES.—After the monthly meeting of the Widnes Local Board last Tuesday, the members, accompanied by the Gas Engineer (Mr. Isaac Carr) and other officers, made their annual inspection of the gas-works. Of course, the principal matter of interest was the Dinsmore process of carbonization, the working of which was fully explained by Mr. Carr, who showed the members of the Board the quality of the gas supplied to the town—*i. e.*, ordinary gas enriched with one-sixth part of the Dinsmore gas, the quality of which was 18 candles. He afterwards showed the Dinsmore gas alone—the quality being 22 candles—and the members expressed themselves highly gratified with the result. As our readers are aware, Mr. Carr has effected several improvements in the process; and the Dinsmore Company have recognized his services, and granted the Local Board the free use of the patent. The spacious new retort-house which has been erected for the extension of the Dinsmore plant was also carefully inspected. It is stated that the adoption of the process at Widnes has obviated an advance of 3d. per 1000 cubic feet in the price of gas, which would have been necessitated by the recent rise in the price of coal.

THE ELECTRIC LIGHTING SCHEME FOR LEEDS.—After due consideration, the Electric Lighting Committee of the Leeds Corporation were, at the meeting last Tuesday, able to formulate recommendations for the consideration of the Town Council with respect to the lighting of the borough by electricity. The report of Mr. T. Hewson on the subject (*ante*, p. 1051) was presented and adopted. A series of recommendations to the Council were then made on the motion of Alderman Tatham, seconded by Alderman Spark. The first related to the lighting by electricity of the Council Chamber, the Courts of Justice, and the offices in the Town Hall and the Municipal Buildings by means of 2000 incandescent lamps, at an estimated expenditure of £3000. The most important of the recommendations was to the effect that the Council should themselves apply to the Board of Trade for a Provisional Order authorizing the Corporation to supply electricity for public and private lighting within the business portion of the town, and also to the residential parts of the borough, at an estimated cost of £68,000. On this application being attended by the success hoped for, it is then recommended that of the £68,000 the Committee should be allowed to spend £25,000 in the provision of an installation of electric lighting, which shall be thoroughly complete in itself, and be capable of meeting the demand which it might be expected would be made for the light from the business and residential centres.

A GENEROUS OFFER BY THE WEYMOUTH GAS COMPANY.—At the last meeting of the Weymouth Town Council, a letter was read from the Secretary and Manager of the Gas Company (Mr. J. Lowe), in which he stated that his Directors, desiring to contribute their share in promoting the good of the town, and to co-operate with the Corporation in making the Esplanade more attractive to visitors, and to the inhabitants generally, had decided to improve its lighting by substituting new lamps of improved design and increased illuminating power for the ones now in use. The cost of providing the new lamps and the extra consumption of gas would be undertaken by the Company. He ventured to hope that this effort to assist in forwarding the town improvements would be appreciated as readily as it was cheerfully given. The Mayor (Mr. J. Groves) said he thought they should accept this offer most thankfully. He considered it was very liberal of the Company. During his mayoralty he had often experienced the ready help and kind assistance of the Gas Company; and the excellent advice Mr. Lowe had given in making the town attractive by illuminations. Mr. Lowe had always been ready to help in everything in his power for the good of the town; and he (the Mayor) thought this would be one of the greatest improvements they could possibly have. He proposed—"That the Town Clerk be instructed to write to the Directors of the Gas Company, thanking them for their kind offer to place improved lamps on the Esplanade as suggested, and that the same be accepted." Mr. Fowler seconded the proposal, which was carried.

Miscellaneous News.

ELECTRIC LIGHTING IN THE METROPOLIS.

BOARD OF TRADE INQUIRY.

(*Before Major* MARINDIN, C.M.G., R.E., *assisted by Captain* CARDEW.)

EIGHTEENTH DAY—WEDNESDAY, MAY 1.

Mr. PEMBER, before resuming the points of his speech, unfinished on the previous day, said he wished to make a few remarks as to the question of the Board of Trade unit. He had been told that whilst at Brighton the Inspector had said something to the effect that the Board of Trade had made up their mind not to adopt the unit.

Major MARINDIN said he had informed the Board of Trade that it would be well not to adopt the unit; but he was quite ready to hear anything the learned Counsel might say in favour of its adoption.

Mr. PEMBER proceeded to state that the unit as used in the schedule of the Corporation he represented was to be the energy contained in a current of 10,000 ampères conveyed under an electro-motive force of one volt for one hour. The original Board of Trade unit was that divided by 10—viz., 1000 ampères. The Grosvenor Gallery charge was 7¼d. for the present Board of Trade unit. Supposing they came to the conclusion that, without damage to the Corporation, and, of course, with advantage to the consumers, they could lower the price of electricity, the question was what was the smallest known coin of the realm by which they could reduce it. It was a farthing. This would be the smallest reduction they could make on the Board of Trade unit; and it would be a little above 3 per cent. Taking the case of the gas companies, they used for purposes of measuring and charging 1000 cubic feet; and their price was 3s. 2d. per 1000, or a good deal more than 7¼d. So that the drop of a farthing to the gas companies, supposing their profits increased so as to allow of a diminution in charge, would be only something like ¾ or ¾ per cent., which was very small. Therefore, with the large unit the gas companies had, they could, with advantage to themselves and to the consumers, very well reduce from point to point. But until there was some change in the production that would warrant such a step, it was obvious that an electric lighting company could not, with such a unit as theirs, come down from 7¼d. to 7d. Unless there was some good reason for retaining the Board of Trade 1000-ampère unit, it would be better that it should be multiplied by 10, so that the electric light companies would have a similar advantage to that possessed by the gas companies.

Major MARINDIN: No doubt the Board of Trade will consider your remarks; and they possibly may induce them to reconsider their position.

Mr. PEMBER hoped this would be so. Proceeding to refer in detail to the objection raised against the London Electric Supply Corporation system, he said many of them came under the head of insulation. The first—that of short-circuiting—was connected with the jointing of the mains, and had been anticipated by Mr. Ferranti. He (Mr. Pember admitted that the testing of the mains by itself was not proof positive that the jointing would stand as well as the main; but the mains had been tested up to 1000 volts. Without going farther, he might urge that if the joints were carefully made with all the provisions and safety appliances known to science, and if a bit of the main could stand 1000 volts, the joints were not going to be 100 times worse. There was a margin of 100 between the electricity that would pass and the 1000 volts at which their mains had been tested. As a matter of fact, Mr. Ferranti had made a test within only a few days, and found that the main would stand a pressure of 650,000 volts. This seemed to him to be a conclusive answer to the question of safety. Mr. Ferranti also said, on the subject of jointing and volting, that any effect of high voltage would show itself at once, and that there was no more reason why there should be a decay of a well-made joint than of the main itself. Dr. Fleming, in support of Mr. Ferranti, had said that the insulation of the trunk mains of the Corporation was perfectly feasible. Of course, the higher the degree of electro-motive force, the greater the precautions required to be taken. The real meaning of the evidence was that the jointing difficulties, which Mr. Ferranti had absolutely overcome, required care, skill, and experience; but with this they could bring it to a successful issue. Sir William Thomson, having been asked if there was any practical difficulty in going from 2400 to 10,000 volts, replied: "I do not think there is any insuperable difficulty; but it is a very great experiment." It was really not an experiment; the system was an application of the result of experiment, and was justifiable. With reference to Mr. Preece, this gentleman did not speak of the system of the Corporation as being impossible, but said it was a gigantic experiment. He said that generally he was a decided advocate for lighting large areas by the alternating-current transformer system, and that he considered it simply a commercial question. There was, he said, almost as much to be urged in favour of one station down the river as in favour of central stations. Then as to the experiment, he said his objection to the scheme of the London Electric Supply Corporation was the connection made between Deptford and London by means of mains. His objections were as to the difficulty of transporting energy from Deptford to London; and he said he anticipated troubles in connection with insulation, jointing, and disturbance of contiguous telegraphs and telephones. The pith of his objections was, however, as to the connection between the dynamo and large transformer at the distributing station in London. With reference to the supposed danger to persons and possible interference with the telegraphs, Mr. Preece was asked if he had any doubt that a cable carrying electric current from Deptford to London could be made which would get rid of what might be called the Post Office objection; and he answered, "None whatever"—adding that it would ensure safety to the public. What more, the learned Counsel asked, was required? Was not this absolutely conclusive from the most eminent witnesses called during the whole of the inquiry? With reference to the question of a stoppage of supply from a breakdown, this had also been anticipated by Mr. Ferranti, who in his evidence said that it would be a very simple act to switch off from one machine to another, and that it would only take a second or two. All the silly talk about panics at theatres might be treated with ridicule; and he (Mr. Pember) could not understand the common sense of the people of London being at so low an ebb that the momentary eclipse of light—a momentary darkness of only a second or two—would cause them to think a catastrophe would follow. He could not conceive of the public being so ignorant of what had, up to the present, been the recognized fault of the electric light, in its being liable to momentary cessation. But, according to the evidence, the eclipse would be over quickly. It was said that the main might break, and that the transformer system lived from moment to moment. But this was the case with everybody. Gas as an auxiliary was not wanted for the transformer system. The scientific witnesses had described how it worked. In the case of a transformer breaking down, there was the rest of the apparatus which could be switched on to do the duty. With reference to the supposed leakage from the primary to the secondary main, it had been spoken of as a recognized difficulty in working the transformers. But this was a difficulty which arose only in the initial stages of electrical distribution; and it had been overcome for some years

There was not the supposed danger of transformers in private houses; for in the first place there would not be a transformer in every house. For small consumers there would be a transformer for every 20, 30, or 40 houses. Mr. Ferranti had used transformers in houses for the last five years; and his experience was tolerably satisfactory, especially as the voltage was the same as there would be in the distributing main. Then the objection as to the variableness of pressure was a sort of "try on." But it had been dismissed even by two hostile witnesses; and it was said that it would be just as easy to maintain uniformity of pressure by the transformer as by the other system. The London Electric Supply Corporation plan would preserve high constancy of electric force; for it was well known that constancy of pressure could be maintained much more easily by high pressure than by the low pressure of the direct system. As to the loss of efficiency, the transformer efficiency was greatest when working with an average load. A moderate increase or decrease of tin had made very little difference; and it was admitted that the load must fall 90 per cent. before the efficiency fell 30 per cent. One of the last objections was that there was no known motor suitable for working in connection with the transformer system. But this was not true, for there was one in existence, although it was not yet in the market. One of the electricians of some eminence was asked: "Have you any doubt that the difficulty of the finding of a proper motor adapted to the alternating system will be overcome." His answer was, "Certainly not." Another objection was as to the life of the lamps; and Dr. Fleming said on this point that there was very little difference in the life of lamps between the alternating and the direct system. The last objection was as to the question of the expensiveness of the Corporation system. But their cost for the 250,000 lamps was only about £500,000; whereas, as far as he could make it out, for the direct system the probable expenditure for 26,000 lamps would be £108,000. And the Corporation knew the end of their expenditure. The evidence of one who was no enemy to the direct system said that the storeage was very expensive, and that it was suitable only for a limited area. For a large distribution he preferred the alternating system. The storeage batteries were too expensive; and Sir W. Thomson said they were impossible on a large scale. Apart from the considerable expenditure connected with the battery system, there was great depreciation. The decay in the positive plates in the battery was 33 per cent., going down to 25 per cent.; and the decay in the negative plates was 14 per cent. There was an average decay in the two sorts of plates, which, taking the highest of the lowest percentage, worked out at from 23·50 to 19·50 per cent. There was really a new plate required every five years. According to reliable figures, a total repair would be wanted once in every five years. This was exclusive of the engines and mains. What had been said about the price proposed by the Corporation? It was 8d. per Board of Trade unit. The Chelsea Company's price was 10d. But in the Provisional Order it was 8d.; and they charged 8d. in Chelsea. By the transformer system from the Grosvenor Gallery, it was only 7¼d. The Metropolitan Company's price was 8d., although it was true that in the St. James's agreement they were going to charge 7d.; but they had not had the experience of the working of the Corporation. The learned Counsel, in taking exception to the system and Order of the Chelsea Company, said it would be a monopoly and a syndicate of purveyors of plant. Much the same sort of indictment could be made against the Electrical Power Storeage Company, which was not, in the proper sense of the term, a light-purveying company. It was only to light-purveying companies that Provisional Orders should be granted. The public desiring light ought not to be handed over to the mercy of a group of patentees. If their Order were granted, the Board of Trade would be encouraging the very worst form of monopoly that could be established—viz., the monopoly of parties who would tie down the district to one particular form of supply. As to the Westminster and St. James's Companies, he said they ought not to be granted exclusive rights over small and lucrative areas, as this would not be fair to large companies like the London Corporation. The only way to deal properly with the electric lighting of London was on a large scale. If the Corporation were allotted a large district such as they asked for, they could take the rough with the smooth; but the smooth should not be taken away from them. Their resources would enable them to give the best supply on the hypothesis that they had the good and paying as well as the other portions of the district. As to the difficulty of districting, he did not think it would be easy to hold the scales evenly, as there must always be a considerable amount of uncertainty and speculation as to how districts would turn out commercially. One part might, from some unforeseen circumstance, turn out to be worthless, and another part might be a gold mine. Added to the uncertainty was the highly problematical character of the future of electricity, and also the question whether the current would be required for both lighting and motive power. There was a great difference in districting for electric lighting companies and in districting for gas companies. The districting for the latter had been fairly well done. Gas was so comparatively cheap when it was first introduced, that it was obvious that its universal adoption was an absolute certainty, and only a question of time. But in the case of electric light they could only guess at the chances as to its probable use. Electricity was a far more complex matter than gas, and mistakes made now would be very difficult to set right; for the vested interest, in the shape of the company in possession, would be very strong. A mistake made at present in the settlement in the direction of districting would probably hold good for 42 years, with all its consequences to the consumer, to the local authority, and to the excluded company. These were considerations which should be seriously borne in mind by the Board of Trade and Parliament before coming to a decision on so important a question. With reference to the agreements entered into by the Metropolitan Company with the districts of Marylebone and the Strand, they were not such as the Board of Trade should sanction. The Board should, as a matter of general policy, consider those agreements not as private matters, but as parts of a Provisional Order involving general policy, and also as involving the liability to set a precedent over which they had complete jurisdiction to alter, accept, or reject, and generally to deal with, and without reference to their origin, just as if they had been part of a Provisional Order originally, and had been put there without any consent between the Company and the Local Authorities. In fact, the agreements must be disregarded, or dealt with in such a manner that they must not stand in the way of a statesmanlike and general settlement of the electric lighting of the Metropolis. If there were special circumstances, the agreements should be set aside; and really the whole of the agreements bristled with special circumstances which warranted the interference of the Board of Trade. In settling the supply of the electric light for London, the Board of Trade must have a perfectly free hand to map out that part of London which was affected by the Order; but if the claims of the Strand and St. Marylebone were allowed, it would interpose a veto against the Board of Trade so dividing up London for lighting. It would be a very serious contingency for the Board to allow the small local authorities to hamper the system of the London Electric Supply Corporation by standing out and making separate agreements. He questioned whether, on public grounds, those local bodies really represented the view of the persons who would require the light, and who were supposed only to want to get their supply from the mains of the Metropolitan Company. The Board of Trade, instead of looking upon the agreements as final, should regard them with considerable suspicion. They were not only far too narrow, but were contrary to the policy of Parliament. All the antecedent negotiation was bad, and should not be encouraged and allowed. Besides, competition, if it was to be fair, should be universal. It looked very much as if the system of the London Corporation would prove to be the best, and as if its advantages were such as to be ultimately adopted by other companies. After stating, as to the dissent of the City, that they would receive equal consideration to other districts, the learned Counsel concluded by urging that the Provisional Orders of the Corporation he represented should be granted by the Board of Trade.

At the close of Mr. Pember's address,

Major Marindin said he would prepare his report as soon as possible.

Mr. Pember then, in the name of all the parties, cordially thanked Major Marindin for the great courtesy and kindness he had exhibited throughout the inquiry, and the proceedings closed.

Major Marindin's Report.

Major Marindin's report was made public on the 18th ult. We gave in the Journal for May 21 (p. 955) the general conclusions arrived at by Major Marindin; and it now only remains to reproduce his recommendations to the Board of Trade as to the course to be pursued by them in respect of the several Companies whose applications had formed the subject of his inquiry. These recommendations were as follows:—

I. *The London Electric Supply Corporation.*—As this Company and the Metropolitan Company are competing in many parishes and districts, and are both Companies working with alternating currents, unable at the present time to provide for motive power, the areas applied for should be districted; and I propose, therefore, to allot to the London Companies and to include in the London Order the following parishes and districts;—The portion of St. Martin-in-the-Fields lying to the south of the Strand and west of St. Martin's Lane; the portion of St. Margaret and St. John, Westminster, lying to the north of Victoria Street, excepting that portion of St. Margaret's lying to the west of St. George's, Hanover Square; St. James, Westminster; St. George, Hanover Square; Chelsea; the Greenwich district; St. Mary, Rotherhithe; St. Mary, Bermondsey; the district of St. Olave; the district of St. Saviour, Christchurch; and that portion of St. Mary, Lambeth, lying to the north of Westminster Bridge Road.

The only dissenting local authorities in the above areas are the Vestries of St. James, Westminster, of St. Mary, Lambeth, and of St. Margaret and St. John, Westminster, and the District Board of St. Saviour's. But of these the first two would, judging from the statements of their representatives at the inquiry, consent, if their objections be, in the opinion of the Board of Trade, fairly met; and it should be pointed out to them that while St. James's would, under the terms of the Order, gain by the compulsory removal of the overhead wires with which the London Company is at present largely supplying in the parish, it is in the case of St. Mary, Lambeth, essential to the continuity of the London Company's area that this Company should have the means of passing through the northern end of the parish. This last reason applies equally to the parishes of St. Margaret and St. John; and the opposition of the united Vestry of these parishes was not so strong as to lead to the belief that it would object to the division of the parishes as I propose between the two Companies, especially as there appears to be a demand for electricity in the district. The district of St. Saviour's, after assenting to the granting of the Order, withdrew the assent, but did not appear at the inquiry to give any reasons for so doing; and as the district intervenes between other portions of the London area, the local authorities of which have assented and wish for the supply of electric light, I submit that the objection of St. Saviour should be overruled. The case of St. James and St. John, Clerkenwell, is difficult to deal with. This parish is cut off from the district which I propose to allot to the London Company; and the Metropolitan Company has abandoned the North London Order, in which it was included, while the Vestry has assented to the entrance of both Companies. If the City should consent to allot a district to the London Company, giving access to Clerkenwell, this parish should be added to the London area, otherwise it might be suggested to the Metropolitan Company to adhere to their North London Order so far as this parish is concerned.

The general form of the clauses of the Order should be similar to those in the other Orders for the Metropolitan area; and it will be better to deal with all the suggestions and requirements of the local authorities on this head generally, when the principles upon which the Orders are to be granted have been considered and determined. But there are two special clauses in the London Order, which have already been alluded to, and might be dealt with separately. I do not see any objection to clause 55, authorizing the supply to a local authority of electricity in bulk, provided, in the opinion of the legal authorities, it be possible to place the local authorities under the obligations of the Order by any such clause. As to clause 56, I think that, subject to the sub-division of the generating station at Deptford, as recommended in this report, it would be a mistake to reduce the cubical dimensions of the building. A compliance with the recommendations above-mentioned should be a condition upon which the granting of the Order should depend.

II. *The Metropolitan Company.*—To this Company I would recommend that the following area should be allotted:—

Under the Mid-London Order: St. Giles-in-the-Fields; St. George's, Bloomsbury; St. Andrew, Holborn-above-Bars; St. George-the-Martyr; St. Sepulchre, Saffron Hill; Hatton Garden; Ely Rents and Ely Place; the Liberty of Glasshouse Yard; St. Ann, Soho; St. Paul, Covent Garden; St. John-the-Baptist; Savoy, or the Precincts of Savoy; St. Mary-le-Strand; St. Clement Danes and the Liberty of the Rolls; together with the extra-parochial places known as the Charterhouse, Gray's Inn, Lincoln's Inn, Staple Inn, and Furnival's Inn. The whole of the local authorities in the above area assent to the Order.

Under the West London Order: St. Marylebone, the Vestry of which assents to the Order.

Under the South London Order: St. Mary, Lambeth; St. Leonard, Streatham; and Clapham. Neither of the local authorities affected—viz., the Vestry of St. Mary, Lambeth, and the Wandsworth District Board—has signified its assent; but both would probably do so if their objections be met in a manner considered fair by the Board of Trade.

Under the Bill: That portion of St. Martin-in-the-Fields which lies to the east of Northumberland Avenue, Charing Cross, and St. Martin's Lane. The Vestry of St. Martin-in-the-Fields assents to the Bill.

With powers in this area, the Metropolitan Company will have access from the main portion of the Strand district to the outlaying portions, and will also have powers over some portion of the parish of St. Martin-in-the-Fields contiguous to their existing station in Whitehall. In the latter portion, although the Company will be competing with the London Company, there will not be two alternating-current companies, as the supply from the Whitehall station is by continuous current. The only

area in which there will be two competing alternating-current companies is in North Lambeth, where it cannot well be avoided.

III. *The House-to-House Company.* IV. *The Notting Hill Company.*—I recommend that the areas as agreed to between these Companies and the Vestry of Kensington be approved of, and the Orders granted in suitable terms.

V. *The Kensington and Knightsbridge Company.*—Similarly in the case of this Company, I recommend that the area as agreed to between the Company and the Vestry of Kensington be approved of, and the Order granted. With regard to the part of the parish of St. Margaret, Westminster, applied for, I recommend that the Order be approved of, subject to the consent of the Vestry. This body has decided to object to the powers which are being exercised under Licences granted by consent being extended to those given by Provisional Order; but I trust that the matter may be so represented that this decision may, on reconsideration, be altered.

VI. *The Chelsea Company.*—South Kensington Order: This Order is assented to by the Vestry of Kensington; and I recommend that it be granted for the area agreed to. Belgravia Order: In the case of this Order, I see no valid reason for dispensing with the consent of the Vestry, which has been withheld. Consent has been given to the Orders of three other Companies.

VII. *The Westminster Company.*—Although the scheme of this Company is in a somewhat inchoate condition, the Vestry of St. George's, Hanover Square, has assented to the Order. The Vestry of St. Margaret and St. John, Westminster, withholds consent; but, for reasons already given, I consider that powers over part of the area asked for in this district should be given—the existing station of the Company being in this area. I recommend that the Order be granted for the parish of St. George, Hanover Square, and the portions of St. Margaret and St. John, Westminster, lying to the south of Victoria Street. This Company has abandoned the remainder of the area originally applied for.

VIII. *The Electrical Power Storeage Company.*—Paddington Order: In view of the objection of the Vestry, and its expressed intention to undertake the lighting of the parish, and for other reasons given below, I cannot recommend that this Order be granted. St. Martin's and Strand Order: The Vestry of St. Martin's assents to, and the Strand District Board dissents from the Order. The Company applying for these Orders is a Company manufacturing batteries and other electrical appliances; and it seems more than doubtful whether, under the Articles of Association, there is any power to undertake the manufacture and supply of electricity for house-to-house lighting purposes. However this may be, it is perfectly clear, from the evidence of the Manager of the Company, that the Company does not intend to exercise the powers which would be granted by the Order, but to transfer them to some other persons. I have no doubt that these persons are perfectly willing and competent to carry out the powers and obligations of the Order; but I submit that it would be quite contrary to practice to grant an Order to any but a properly constituted company, proved to be in a position to act under it and, as this has not been done, I cannot recommend that the Order be granted.

It should be understood that in every case the recommendations to grant these Orders is on the understanding that the whole of the works, both at the generating and other stations, and along the mains are to be planned and executed in a manner such as to satisfy the Board of Trade that the public are properly protected, both as regards safety, and, so far as may be possible, from any extinction of the light for an appreciable time, and that, should it be found impracticable to carry out the districting between the London and Metropolitan Companies in the manner which I have proposed, the whole question will be reconsidered so that the areas may be fairly re-adjusted.

The Metropolitan Orders for the Strand and Marylebone should be in as nearly as possible the same form as those applying to other parts of the Metropolis, as there does not appear to be any sufficient reason for treating these areas differently from any others.

The only districts applied for in which I have decided not to recommend the granting of Orders, as amended, are the parishes of St. Pancras and Paddington, where the Local Authorities should, I think, be granted time to decide definitely whether or not to carry out the lighting of their parishes under the powers of a Provisional Order; and the City, which, although not exempted from the operation of the Electric Lighting Acts, is in a somewhat different position from other parts of the Metropolis.

The Commissioners of Sewers, acting for the Corporation, are endeavouring to obtain tenders for the lighting of the City; but I see no reason why the principle that all such lighting should be done under statutory powers and obligations should be departed from in their case.

If the Board of Trade should agree in this view, I would urge the Commissioners of Sewers to consider whether the Orders, as remodelled, do not sufficiently provide for all their requirements, and in that case to consent to the division of the area of the City between the two competing Companies—viz., the London and the Metropolitan Companies—the latter Company being allotted the portion nearest to the Strand district, and the former the central and eastern portions of the City, so that access may be given to the parish of Clerkenwell, the Vestry of which wishes for an Order to be granted to this Company.

In addition to the above-mentioned Provisional Orders, the two Licences applied for by the Chelsea Company and the House-to-House Company have to be considered. These Licences are both for areas included in the portions of the parish of Kensington allotted to the Companies respectively by the Vestry, and the consent of the Vestry has been given. Subject to any alterations in clauses which may be found necessary to make the provisions of these Licences similar to those of the Provisional Orders applied for, I can recommend that, for the purpose of expediting the commencement of the works, they be granted.

[Captain Cardew, the co-Inspector, signifies his concurrence in the conclusions arrived at by his colleague.]

PROJECTED ELECTRIC LIGHT SCHEME FOR NORTHAMPTON.—On Monday evening last week, the Northampton Town Council, on the recommendation of the Highway and Lighting Committee, consented to an application being made to the Board of Trade for a Licence by the Northampton Electric Light and Power Company, Limited, for the supply of electricity within the borough.

SALTASH WATER SUPPLY.—Last Tuesday, Mr. J. L. Smith, one of the Local Government Board Inspectors, held an inquiry, respecting the application of the Saltash Town Council for leave to borrow £6000 for works of water supply. The scheme proposed by the Engineer (Mr. H. B. Nichols), it was explained, would provide the borough with 70 days' supply; the storeage reservoirs holding 2 million gallons. The Inspector intimated that, if the Local Government Board sanctioned the scheme, and it cost more money than was applied for to properly carry it into execution, the Board would allow the extra expenditure. At the close of the inquiry, the Inspector, accompanied by members of the Corporation and the Engineer, visited the proposed sites of the reservoirs. The springs were tested; and the supply was found to be satisfactory.

MAURITIUS GAS COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held last Tuesday, at the London Offices, 14, St. Mary Axe, E.C.—Mr. J. B. GILL in the chair.

The SECRETARY (Mr. Alfred Hersee) read the notice convening the meeting; and it was agreed to take as read the Directors' report for the year ending Dec. 31, the principal portions of which were given in the JOURNAL last week.

The CHAIRMAN said it was with the greatest regret that the Board had now to submit such a melancholy statement to the proprietors. The legacy that was left the Directors—a Company burdened with a heavy capital, and having a vastly increasing expenditure, but a decreasing trade—had caused them in the past year very great anxiety; and this anxiety and responsibility they would willingly escape from if the shareholders considered that matters could be more satisfactorily managed in other hands. However, much had militated against the Company in the past year. In the first place they had had very dear coal; in the second place, a high rate of expenses; and, in the third place, a large loss on exchange. Doubtless the shareholders had noticed that there had been a strike in the Australian coal-fields; and this caused a considerably enhanced price of coal. Coal cost them more in the last year than it had ever done in the past. Then, as to freights, they were unable to take their coal in a large steamer, but were compelled to take small ships, on account of the great expense of landing the coal; and this, of course, greatly enhanced the price. Respecting residual products, the coke stock had somewhat increased; and the old prices could not be very well maintained. As to tar, the demand was exceedingly small. The traffic at Mauritius was principally in sugar; and there had not been any outlet for tar. The Directors had been greatly concerned to find that one of the gasholders had developed a very unfortunate leakage. An attempt was made to repair the holder by patching as customary; but this proved inaffectual. It was found that the decay of the sheets was excessive; and that a large amount of repairs must be executed. As the holder could not be thrown out of use, it had to be repaired at great expense and delay, with a heavy loss of gas, and a large increase in the carbonization of costly coal without any return. The holder was now in working order; and he hoped and trusted all things were going on well. The shareholders would remember that at the last meeting, he (the Chairman) spoke about the disagreement with the Municipality on the question of fines, and stated that the previous Directors had entered into a lawsuit with the Municipality, in order to get some of these fines reduced. The present Directors being particularly peaceful men, endeavoured to the best of their ability to come to terms with the Municipality and were so far successful that the fines which were formerly 2s. per burner, were reduced to 6d. for each contravention; but unfortunately the legal expenses had been costly. As to exchange, there was a large item in the accounts this year of £1960, against £1644 last year. The Directors had no control over this matter; and he was afraid there was no hope of improvement. No doubt the shareholders had read the debate which took place the other night in the House of Commons on bimetallism, and had gathered that the Government would not be able to offer any assistance in this direction. He (the Chairman) was afraid it was a calamity the Company must face in the present, and that they must look forward to in the future. Within the past few days, the Directors had had a form of tender sent them by the Municipality for the purpose of tendering for the supply of gas for another 25 years; but they had not yet had time to go very carefully into it, though they should do so. The Board thought that perhaps two or three of the principal shareholders might join them in their deliberations on this matter, as it required very grave consideration. As far as he was personally concerned, he thought it was perfectly useless going into a new contract of this description, unless they could see some chance of a fair return for their capital. Nothing would be done hastily; and if a few of the largest proprietors would communicate with the Board, they would be happy, when they went into this question, to have their co-operation, advice, and assistance. He thought the shareholders could be congratulated upon the fact that the debenture debt had all been paid off. The call made in August last was met in the most satisfactory manner by the proprietors, and the large sum of £5900 of debentures had been paid off; thus saving the Company a considerable amount of interest. They had had the misfortune to lose their Auditor (Mr. J. R. Peill), who had been connected with the Company for many years. Mr. Eastman had audited the accounts alone on this occasion, and the Directors ventured to think, as the Articles of Association permitted them to have either one or two Auditors, that the shareholders might consider it sufficient to have only one Auditor—at all events for this year; as in October, 1890, the Company must either commence a fresh epoch altogether, or new arrangements would have to be made for the lighting of Port Louis. The proprietors must not lose sight of this fact that, if they did enter into a new contract, they must have additional capital, because (although their Manager, Mr. Farthing, had been working very ably, and had put the works in a better position now than they had been in for some time previously) some capital outlay would have to be made upon the plant. He (the Chairman) had a letter some months ago from a member of the Local Committee, who spoke in satisfactory terms of Mr. Farthing; and he (the writer) considered that, when the alterations had been carried out which the Manager had in hand, the works would be in a better condition than they had been in for some years. He then moved—"That the report and accounts be received and adopted and entered upon the minutes."

Mr. N. E. B. GAREY seconded the motion.

Mr. DODGSON remarked that, considering the small amount of money they brought home this year, he did not see where the loss on exchange arose. They appeared to be sending money over to Mauritius.

The SECRETARY: No; there was £4000 remitted home.

Mr. DODGSON: But we do not get any dividend.

The CHAIRMAN observed that they had to pay for certain things which were sent out by different ships—pipes and so on. The largest item was coals, which had vastly increased in price this year compared with previous years. Port Louis was not a particularly healthy town; and people were leaving it to go into the country, and that was one thing that had caused the decrease in the consumption of gas. Then there was the loss on residuals, which was something like £500. They had no trade in this respect except in the island; they could not export tar.

Mr. E. HOOK remarked that the Chairman in his speech, mentioned that the Municipality were asking tenders of other people; and he inquired if there were any other gas companies in Mauritius.

The CHAIRMAN replied in the negative, and added that the Municipality were rather keen on electricity; but he did not suppose they would find any company who would go there. In further reply to Mr. Hook, he said the Company had two gasholders.

Mr. SOLOMON observed that there was nothing to comment upon in the report. He hoped things were not worse than was represented.

The CHAIRMAN said they had nothing to conceal from the proprietors; and he believed their position was as represented in the report.

Mr. SOLOMON inquired if the Board had asked the terms upon which the Municipality would take over the works.

The Chairman said the Municipality were not bound to buy the works. They could make an offer for them if they liked at the end of the concession.

Mr. Dodgson asked when the concession ended.

The Chairman answered in twelve months from October. He had been in correspondence with some friends at Mauritius; and they did not seem to be very anxious to make an offer for the works.

General Tupper asked what amount of capital would be required if the contract was renewed with the Municipality.

The Chairman said he could not say.

Mr. Garey observed that, with the renewal of the concession, the Municipality might require the Company to put up 400 additional lamps. They had now 800 lamps. New mains would be needed; and it would be necessary to give some attention to the gasholders and plant, which were in a bad state.

Mr. Youngel asked whether the Board could obtain an offer from the Municipality for the works, and submit it to a meeting of shareholders.

The Chairman said they would not enter into a fresh contract or venture to do anything without consulting the shareholders. In answer to a further question, he said the Company were bound to supply the Municipality with gas until October, 1890.

Mr. Garey pointed out that the arrangements must be made before October, 1890, to allow of the erection of new works in the event of another company obtaining the contract. The tenders were to be in by the first mail in October next.

Mr. Dodgson said, as to lighting the town after the end of the concession, if they could not do that except at a loss, they should leave the place in darkness.

The Chairman admitted the folly of attempting to supply the town, unless they could see their way to making a fair profit. The Municipality would find, if they could not get a tender from elsewhere, that the Mauritius Gas Company would not light the town except at an advanced price, and this might lead them to make an offer for the works. It was on this very point that the Board required the co-operation of two or three of the shareholders.

The resolution was then unanimously carried.

On the motion of the Chairman, seconded by Mr. Solomon, the retiring Director (Mr. N. E. B. Garey) was re-elected.

It was next decided that one Auditor would be sufficient for the present; and Mr. Eastman was re-appointed, at a remuneration of 15 guineas.

The Chairman then moved a vote of thanks to the Secretary, Manager, and staff. He spoke of the arduous nature of the work in which they had been engaged during the past year; and said that the condition of the accounts was a source of real trouble to Mr. Hersee.

Mr. Solomon seconded the motion, which was unanimously agreed to.

The Secretary having briefly acknowledged the vote,

A similar compliment was paid to the Chairman and Directors, on the motion of Mr. Solomon, seconded by Mr. Hook.

The proceedings then terminated.

DENTON AND HAUGHTON LOCAL BOARDS GAS SUPPLY.

The statement of accounts of this undertaking for the year ending March 25 last have just been issued. The following particulars as to manufacture, &c., have been prepared by Mr. James M. Veevers, the Manager of the Works:—

	1889.		1888.	
Income from gas*	£6858	1 1	£6,908	8 4
" " meter hire	84	11 10	83	18 6
" " tar and liquor	330	5 6	479	9 4
" " sulphate of ammonia	350	12 1		
" " coke	620	9 0	476	2 10
" " sundries	51	4 3	23	19 1
Average cost of gas made per 10.0 c. ft.	1	2¼	1	5
Average cost of gas sold per 1000 c. ft.	1	4¼	1	7½
Average price of gas sold per 1000 c. ft.	3	0¼	3	2¾
Gross profit per 1000 cubic feet of gas sold	1	8	1	7¼
Annuities per 1000 cubic feet of gas sold		7¾		8½
Interest on loans per 1000 feet of gas sold		7¼		8¼
Cost of cannel and coal	2225	13 5	2289	0 0
Quantity used in tons	4644		4475	
Average price per ton	9s. 7d.		10s. 2¾d.	
Total make of gas in cubic feet	51,486,500		48,788,700	
Total sale of gas in cubic feet	45,449,600		42,810,022	
Loss	6,036,900		5,978,478	
Loss per cent.	11·72		12·25	
Gas made per ton in cubic feet	11,085		10,927	
Gas sold per ton in cubic feet	9,786		9,566	
Average illuminating power, candles	19·27		19·28	

METROPOLITAN GAS COMPANY OF MELBOURNE.

Completion of the New Holder.

We learn, from a copy of the *Melbourne Argus* for the 8th ult. which has just reached us, that the new holder that has been erected by the Metropolitan Gas Company of that city was brought into use on the previous day; the ceremony of turning the gas into the mains being performed by Mr. Laurens, M.L.A., who replaced the Mayor of North Melbourne (Mr. Gracie), in the presence of a numerous company, which included the Mayors and councillors of the cities and boroughs north of the Yarra, several members of the Legislative Assembly, and many of the leading commercial gentlemen of the city. Prior to the ceremony, the Chairman of the Company (Mr. J. Benn) gave a few particulars as to the work of which they were about to celebrate the completion. He said it was commenced rather more than two years ago by Mr. N. Kingston, who obtained the contract for the excavation and building of the tank, which is of brick and cement with concrete foundations. It is 196 feet in diameter and 35 feet deep, and required upwards of 4 million gallons of water to fill it. The holder, the capacity of which is 3 million cubic feet, was made by Messrs. R. Dempster and Sons, Limited, of Elland; and erected by Messrs. Clayton, Son, and Co., Limited, of Hunslet, near Leeds, under the supervision of Mr. Parfitt, their representative. About 850 tons of iron and steel were used in its construction; and in order to get the maximum strength with the least weight, mild steel was largely employed. The holder is in three lifts, each 35 feet deep, having diameters of 188, 191, and 194 feet respectively; and when full it will rise to a height of 105 feet. Its total cost, with some accessory works, was £50,000. The holder will receive its gas from the Company's works at West Melbourne, and will be used specially for the better supply of the northern suburbs of the city. After the gas had been turned into the mains, the party was conveyed to the head works on the banks of the Yarra, through which they were conducted. Their magnitude and completeness gave rise to much favourable comment. Subsequently the visitors partook of luncheon; and among the toasts honoured was "The Directors of the Metropolitan Gas Company." The Chairman of the Company, in responding, gave an interesting account of the works which had just been inspected. He said that during the past five years they had been entirely rebuilt and enlarged, and refitted with the latest and most modern appliances for making and purifying gas. Hydraulic power had been used, and labour-saving machinery introduced to a large extent. The same might be said of the South Melbourne works. To meet the increased demand for gas, the Directors had expended during the five years 1884-8, at all the works, on buildings, land, and plant, £165,989; on holders, £115,339; on mains and services, £224,711; and on new meters, £60,526—making a total of £566,565. Approximately, there were more than 700 miles of mains; and about 100 miles of service-pipes had been laid annually for some years past. The Company have now nearly 70,000 consumers. About 80,000 tons of coal would be required during the present year at the head works, which were capable of extension so as to be equal to twice their present make. The Directors had had a great deal to do to keep pace with the increased demand for gas during the past five years—an increase which he had been assured by competent engineers was unequalled in any English town in the same period. The Company's Resident Engineer (Mr. J. T. Wynne) also furnished some statistics as to the progress of the undertaking. He stated that when the amalgamation of the Companies took place eleven years ago, the aggregate production of the three works was 620 million cubic feet of gas per annum. Last year it reached nearly 1700 millions. So that the production had been nearly trebled in eleven years, which must be considered very satisfactory, in view of the fact that in England 6 and 7 per cent. per annum was regarded as a good increase. These figures would give some idea of the work devolving upon the Resident Engineer and his staff. For the first few years it was a great struggle to overtake the work; but now the Company were in a position to supply 50 per cent. more gas than was at present required. The expensive works which had been undertaken spoke well for the enterprise and liberality of the Directors, who acceded readily to the demands made upon them from time to time by their Engineers.

METROPOLIS WATER SUPPLY.

The returns furnished to the Registrar-General by the London Water Companies show that the average quantity of water supplied daily to the Metropolis during the past month was 168,223,098 gallons, against 168,736,939 gallons in 1888. The number of houses served last month was 750,954, or 224 gallons per house, and 28·7 gallons per head of the population; as compared with 737,865 houses and 29·3 gallons per head during May, 1888. Of the entire bulk of water sent out last month, 84,305,006 gallons were drawn from the Thames and 83,918,092 gallons from the Lea and other sources.

In his report to the Registrar-General on the quality of the Metropolitan Water Supply last month, Dr. Edward Frankland remarks: "Taking the average amount of organic impurity contained in a given volume of the Kent Company's water during the nine years ending December, 1876, as unity, the proportional amount contained in an equal volume of water supplied by each of the Metropolitan Water Companies and by the Tottenham Local Board of Health was: Kent, 0·8; Tottenham, 1·1; Colne Valley, 1·5; New River, 2·0; Southwark and East London, 2·2; Lambeth, 2·3; West Middlesex and Grand Junction, 2·4; and Chelsea, 2·8. The water drawn from the Thames and supplied by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Companies was of better and more uniform quality than in April. It was in every case efficiently filtered before delivery. The water obtained chiefly from the River Lea by the New River and East London Companies was efficiently filtered, that supplied by the first-named Company being of better quality than any of the Thames-derived waters; whilst that sent out by the East London Company was equal to the best of these waters. The deep-well waters of the Kent and Colne Valley Companies and of the Tottenham Local Board of Health were, as usual, of a high degree of organic purity; the Kent Company's water being especially distinguished in this respect. The Colne Valley Company's water was softened before delivery, and was thus rendered suitable for washing. These waters require no filtration. They were clear and bright."

Messrs. Crookes, Odling, and Tidy, in the course of their report to the Official Water Examiner for the Metropolis (General A. de Courcy Scott) on the quality of the daily samples taken of the water supplied to London during the past month, say: "The character of the Metropolitan Water Supply during the month of May did not present any noteworthy variation from that recorded now for several months past as being entirely satisfactory; but what variation did present itself for notice was in the direction of an increased degree of uniformity of composition among the different samples examined, of an increased degree of freedom from organic matter, and of an increased degree of freedom from colour-tint. For it is to be noticed that the water supply—although, save on rare exceptional occasions, practically colourless—is yet found, when examined quantitatively by the colorimeter, to approximate more closely to entire freedom from colour at some seasons than at others. Thus taking, for convenience of comparison, the water furnished by the five Companies drawing their supply from the Thames, whereas the mean ratio of brown to pure blue tint in April was as 17:20, in the past month it was as 14:20 only. Similarly, the mean proportion of organic carbon in the same water, which in the first three months of the year amounted to 0·164 part, and had become 0·154 part in April, was found to be further diminished to 0·144 part, in 100,000 parts of the water, in May, with a maximum amount of organic carbon in any one sample examined in May of 0·155 part, as against a maximum of 0·164 part in any one sample examined in April. The mean composition of the supplies of Thames water delivered by the different Companies was practically identical. As usual, the mean proportion of organic carbon in the East London Company's supply derived from the Lea was somewhat below even the small proportion present in the water derived from the Thames; while the mean proportion present in the New River Company's supply of mixed Lea and spring water was appreciably lower still."

The Shrewsbury Corporation and the Vyrnwy Reservoir.—Possibly alarmed by the recent terrible catastrophe in America, the Shrewsbury Town Council, at their meeting on Monday last week, discussed the question of the safety of the Vyrnwy reservoir; and it was unanimously resolved to petition Parliament to have an inspection of the dam made forthwith, and repeated once or oftener each year. The necessity for such an inspection they assert is most urgent. The flood in America was caused by the bursting of a reservoir one-fourth the size of the Llanwddyn Lake when full. It is true that, in place of the earthern dam in the American instance, the Vyrnwy embankment is of rough hewn stone laid in the best cement. At the same time the fourfold volume of water from Llanwddyn would, says a local paper, "as effectually obliterate Shrewsbury, Coalbrookdale, Ironbridge, and the lower town of Bridgnorth, as the minor lake in Pennsylvania has done with respect to the numerous towns which came within the radius of the flood in that district."

* The price of gas was reduced, as from March 25, 1888, from 3s. 8d. per 1000 cubic feet with 4d. discount, to 3s. 2d. net.

NOTES FROM SCOTLAND.

(FROM OUR EDINBURGH CORRESPONDENT.)

EDINBURGH, *Saturday.*

The prospectus is issued to-day of the Scottish Electric Supply Company, which is to undertake the supply of electric lighting and power in Edinburgh and the neighbourhood. It is a carefully-prepared document, which, while professing to keep well within the truth, is—like most prospectuses—not altogether free of the blemish of arriving at conclusions which only promoters look upon as practicable. The nominal capital is to be £100,000; but only £25,000 is to be issued, as the Directors intend to "exercise due caution in introducing the light." They find that "electric light is now used in nearly all the large cities and towns of Europe and America, where it is being profitably supplied from central stations." This refers to America, I suppose, as there is little evidence as yet of its being profitably supplied in this country. Then they announce that "the superiority of electric lighting over all other illuminants is generally admitted;" and although they are good enough to admit their belief that it will never supersede gas, they believe that it "is undoubtedly the light of the future." The Grosvenor Gallery Company is cited as an instance of the success of electric lighting. It is stated that arrangements have been made to secure ground at Lochrin, upon which to erect works. They intend to apply for a Provisional Order, and quote Major Marindin's report in support of that proposal. Before the Company obtain an Order, they will undoubtedly have to undergo a severe contest with the Corporation, which will entail a heavy initial expense. Altogether, the prospects of the fledgling are not over bright.

Treasurer Nicolls' statement, which was read at the annual meeting of the Dundee Gas Commissioners last Wednesday, is a very clear exposition of the affairs of the undertaking. It is evident that the trade of Dundee has benefited largely by the opening of the Tay Bridge two years ago; and the Commissioners have felt encouraged by the circumstance to estimate rather high returns for the current year. These may not be quite realized, although good reasons are put forward for the policy adopted. A reason, however, which is not stated, is that in this year, if all goes well, the Commissioners should have several months' working with the Forth Bridge open, which will, without doubt, bring a further increase to the city, with the consequent impetus which it will give to gas consumption. Gas-stoves do not seem to take in Dundee, which is a matter of surprise; seeing there is a large industrial population. The working classes are the most conservative in matters of custom; but the Commissioners might do worse than make an effort to reach them, and convince them of the advantages of the gas cooker. Treasurer Nicolls is not afraid of either water gas or electric lighting. The former he puts out of account on the ground of cost; and as to the latter he gives the advice that they should be prepared to meet it, should a demand arise. This point, I should say, is open to discussion so long as electric lighting has not reached beyond the experimental stage. A more important consideration than either of the above, is the proposal which Treasurer Nicolls makes that they should reduce their mortgage debt. The fact that he is prepared to tackle that question shows that, in the opinion of those best able to judge, the gas supply of Dundee is now so well consolidated that for years no further outlay will be required upon it; or, in other words, that the Commission has come triumphant through the struggles of its early years, and is now master of the situation, with the possibility of a prosperous career before it. In regard to the portion of the Treasurer's statement relating to the working of the past year, he mentioned that, on revenue account, there was a surplus of £1270 to meet the debit balance of £1356 with which the year commenced; and this result was achieved with the price of gas at 2d. per 1000 cubic feet less than in the previous year, which represents in itself a saving of £3000 to the consumers. Referring to the loan account, it would be observed, he said, that this year they had paid off £2712; thus reducing the capital debt to the comparatively small sum of £149,903. During the year the total delivery of gas amounted to 706,341,000 cubic feet; being an increase of 21,244,900 cubic feet. (We hope to give some further extracts from Treasurer Nicolls' statement next week.)

The Grangemouth Gas Company have reduced the price of gas from 4s. 2d. to 3s. 9d. per 1000 cubic feet; and the charge for meters from 10d. to 6d. per quarter.

Messrs. Dohlin, Sons, and Co., of Leith, have offered 7s. per 100 gallons for the residual products produced at the Forfar Corporation Gas-Works; and the offer has been accepted, subject to security being found. The present price is 3s. 7d. per 100 gallons.

(FROM OUR GLASGOW CORRESPONDENT.)

GLASGOW, *Saturday.*

The Glasgow Corporation Gas Committee have been engaged this week in considering some important communications bearing upon the prospective introduction of electric light in the city under the recent Electric Lighting Act, either by the public authorities or by a private company. The correspondence has given rise to a considerable amount of public interest; and a special meeting of the Town Council is to be held on Monday for the purpose of discussing a proposal to apply for a Provisional Order.

On Tuesday of this week, the Sub-Committee appointed by the Glasgow Corporation Gas Committee to consider the tenders for the supply of coal during the year 1889-90, held a meeting, and made some progress in the direction of fixing the contracts; but the final resolution on the matter was postponed till yesterday. In the course of the week many of the coal owners and coal merchants who had sent in tenders were in a state of keen anxiety to know how the contracts were likely to go. The meeting was duly held yesterday; and there was a full attendance of the members. It was found that about 700,000 tons had been offered including cannels, splints, "pugs," and other varieties of gas coal; but there was a feeling that the contracts for the year should not wholly be fixed at this time. The individual offers ranged up to, in one case, 50,000 tons; and generally there was practically no change in the prices, unless in the case of some of the inferior qualities, which were found to be somewhat higher in price than they were a year ago or at the autumn buying last year. Those tenders which showed an advance in price were generally set aside; the intention being to do as in some recent years—namely, to have a second tendering and purchase in the autumn. At the close of the last financial year on May 31, there was still a considerable quantity of coal in stock, in addition to which there were about 80,000 tons of last year's purchases still to be delivered. After carefully going over the various tenders, the Committee selected to the extent of from 170,000 to 180,000 tons. The amount of coal required for the year is likely to reach to 320,000 to 330,000 tons. During the past year the consumption amounted to 298,645 tons, or fully 22,200 tons more than that of the year 1887-8. In the case of the tender for 50,000 tons, I am told that about one-half was taken by the Committee.

At a special meeting of the Campbeltown Town Council yesterday week, there were under consideration certain plans, specifications, and offers in connection with the proposed extension of the Corporation Gas-Works, including the telescoping of one of the gasholders. The tender submitted by Messrs. Hanna, Donald, and Wilson, of Paisley, was unanimously agreed to—the amount of the tender being £1080. Authority was given to the Gas Committee to have the work executed as promptly as possible.

The following dividends have been declared at the annual meetings this week of the Companies named:—Muirkirk Gas Company, 10 per cent., free of income-tax; Catrine Gaslight Company, 5 per cent.; and the Auchinlech Gas Company, 2½ per cent. It was agreed, at the meeting of the latter Company, to reduce the price of gas for cooking and manufacturing purposes to 5s. per 1000 cubic feet; the price for gas used for lighting remaining at 6s. 8d.

At the last meeting of the Renfrew Town Council, there were submitted the minutes of the Gas Committee, in which it was stated that Mr. James Fulton has been installed in his position as Gas Manager. Various offers of coal for the ensuing year were reported as having been accepted—Dykehead, at 9s. 3d. per ton; Haywood, at 16s. 6d. per ton; and Cairntable cannel, at 21s. 3d. per ton. A number of persons who illuminated their houses or business premises throughout the town with gas on the occasion of the Queen's visit to Blythewood last summer have refused to pay for the gas which was supplied to them; but the Clerk has been instructed to take legal proceedings against them in the event of the amount due not being paid forthwith.

It is stated that the balance of profit on the sale of gas in Johnstone is larger this year than ever. There had been discussions in previous years about the large gas balances; some persons contending that there should be little or no balance allowed to accrue, but that the price of gas should be reduced. A local newspaper states that great complaints were made last winter regarding the high price and the low quality of the gas; and it is urged that the Burgh Commissioners should take into serious consideration the question of a reduction in price. The price is now, and has been for several years, 4s. 4½d. per 1000 cubic feet.

The financial statement of the Greenock Corporation gas undertaking for the past year was submitted to the Burgh Commissioners at their monthly meeting last Tuesday. It showed a gross profit of £612; and after deduction of interest and payment of loan, there was a net profit of upwards of £136.

The work connected with the cutting of the tank for the new gasholder at the Paisley Gas-Works has just been commenced; the contractors being Messrs. Goldie and Son, of Glasgow. It will have a depth of 38 feet to the resting-stones; and there will be a layer of 9 inches of concrete over the entire bottom of the tank, the dry well, and the pipe tunnel. This work is already going on in earnest, and will probably be finished by the end of the year. The diameter of the tank is to be 162 feet. I may mention, incidentally, that some seven or eight applications have been received by Mr. Hislop for specifications from English firms desirous of tendering for the construction of the gasholder which is to be placed in this tank. It may also be stated that the price at which the residual products of the Paisley Gas-Works have been sold this year is 3s. per ton of coal carbonized, as compared with 1s. 4d., which was the lowest price received during late years.

On Wednesday business was done in the shares of the Partick, Hillhead and Maryhill Gas Company on the Glasgow Stock Exchange, at £5 per share—indicating a rise of 2s. 6d. per share; and yesterday business was done at a further advance of 6d. per share.

This week's Glasgow pig iron market has been steady, and Scotch warrants have fluctuated in price between 42s. 4½d. and 42s. 9½d., at which there were sellers at the close yesterday afternoon. The prices of hematite and Cleveland warrants have also fluctuated during the week—to the extent of 6d. and 3d. per ton respectively. There is no change to report in the general position of the trade. Scotch special brands are practically unchanged in price.

No material change has occurred during the week in the local coal trade; and on the whole prices are well maintained.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *June* 22.

Sulphate of Ammonia.—There is only a small business passing in spot parcels; and, generally, somewhat lower prices have been accepted. The transactions f.o.b. Hull range between £11 17s. 6d. and £12; and the latter is also the top figure for parcels at Leith and Liverpool. The demand being rather slack, prompt lots do not appear quite so scarce as they were; and it is, therefore, now unlikely that the advance which was anticipated at one time to occur before the end of the month will take place. Scotch forward business is reported at £11 16s. 3d.; but speculators generally seem to prefer to take such orders for future delivery as may be secured now, without buying in. There is generally little disposition to make engagements forward. Nitrate remains steady—spot, 8s. 4½d.; while cargoes for autumn shipment may be secured at 8s. 10½d.

LONDON, *June* 22.

Tar Products.—Benzols, anthracene, and pitch continue neglected and depressed. Lower prices are being taken for the little business that is now done in them. There is a strong demand for carbolic acid, solvent naphtha, and creosote—owing, doubtless, to the small production at the moment. It is reported that foreign pitch buyers are conspiring to lower the price of pitch; but there is an excellent demand for this article for briquette making at home—a demand which is continually growing, and, owing to the advance in the price of coal, is likely to grow more rapidly. The following prices have obtained during the week:—Tar, 23s. to 28s. per ton, according to position. Benzol, 90 per cent., 2s. 9d. per gallon; 50 per cent., 2s. per gallon. Toluol, 1s. 4d. per gallon. Solvent naphtha, 1s. 2d. per gallon. Crude naphtha (30 per cent.), 1s. per gallon. Light oil, 3½d. per gallon. Creosote, 2½d. per gallon. Pitch, 21s. 6d. per ton. Carbolic acid (crude), 8s. 10d. per gallon. Cresylic acid, 10d. per gallon. Tar salts, 17s. 6d. per ton. Anthracene (30 per cent.), "A" quality, 1s. 1d. per unit; "B," 11d., according to quality.

Ammonia Products.—Sulphate is in poor request; and buyers are hanging off, in the hope of seeing lower prices. Important shipments have been made during the week—no doubt on old contracts. Sales have been effected during the past few days at prices varying from £11 15s. to £12 per ton, according to position. Prices of other products are: Gas liquor (5° Twaddel), 8s. per ton, with a rise or fall of 1s. 6d. per degree. Liquor ammonia, 1¾d. per lb. Carbonate of ammonia, 9d. to 3½d. per lb. Muriate of ammonia, brown, £18 10s.; white, £23 per ton. Sal-ammonia, £30 to £32 per ton.

LAST Saturday, Mr. Justice North made an order for the compulsory winding up of the Atkin's Patent Filter and Engineering Company, Limited.

THE Stockton and Middlesbrough Water Board have accepted the tender of Messrs. W. Scott and Co. of £118,944 for the construction of the Blackton reservoir.

NORTHERN COAL TRADE.—There has been a considerable amount of business in the coal trade of the North of England during the last few days, both in gas and in other kinds of coal. Some heavy orders have been booked for steam coal for Denmark, though the price spoken of—about 9s. per ton free on board in the Tyne—is only a low one compared with the quotations which are current. The collieries are working well for this season of the year, in which there is usually more broken time. In the gas coal collieries a good demand is experienced; and it is anticipated that there will soon be an increase in that demand—the anticipated efflux of the London coal dues in about a fortnight giving ground for the great Gas Companies to order now more freely, so that they may stock coal whilst freights are moderate. The price asked for the best gas coal is about 8s., less 2½ per cent., free on board in the Tyne. But it is well known that some contracts are running at about 1s. 6d. per ton less. The price of bunker coal is steadily maintained; but household coal is extremely dull.

THE HEYWOOD GAS COMMITTEE AND THEIR GAS MANAGER.—The position of the Gas Manager of the Heywood Corporation (Mr. H. Hawkins), in relation to the Gas Committee and the gas-works was under discussion at a meeting of the Committee last week. Mr. Hawkins intends shortly to commence practice in the medical profession, keeping on the position of Gas Manager though residing away from the works. An expression of opinion on the part of the Committee was to the effect that Mr. Hawkins ought to live in the house provided by the Corporation on the works; but he urged that this was not absolutely required, and that one of the stokers might live, there and the Corporation thus save the rent of the house. As to his remuneration, he stated that for the year ended March 25 next he was willing to accept, in lieu of his present salary, 10 per cent. on the net profits of the undertaking with the price of gas as at present. Some of the members of the Committee, however, thought that 7½ per cent. was enough; and eventually the matter was referred to the Council.

SALES OF SHARES.—At a recent sale by auction, 29 "B" shares (£10) in the *Ipswich Gas Company*, the last dividend on which was 8½ per cent., were knocked down at £17 15s., £17 17s. 6d., and £18 each. On the same occasion, 20 "A" shares of similar value, the last dividend on which was at the rate of 11 per cent. per annum, were sold for £24 per share.——Last Tuesday, Mr. W. H. Cronk offered for sale by auction at Sevenoaks a number of shares in the *Sevenoaks Gas Company*. They realized the following prices:—One original £10 "A" share, £23 10s.; four £10 "B" shares, £16 15s. per share; five £10 "B" shares, £16 10s. per share; and two original £10 "A" shares, £23 10s. per share. These shares were of the first issue, and fully paid up. Five "B" shares, second issue, £8 paid, were sold for £13 a share.———Last Thursday, Messrs. Fuller and Moon sold by auction some £5 second and third capital shares in the *Croydon Gas Company* (with dividend). Second capital shares realized £14 5s. and £14 10s. each; and third capital shares, uniform prices of £11 2s. 6d. Some *Carshalton Company's* £10 shares, £2 paid up, sold at £3 5s. each.

THE LONDON COUNTY COUNCIL AND THE COAL DUTIES BILL.—At a special meeting of the London County Council held last Friday, an important point as to the position of the Council in regard to Sir Joseph Pease's Bill, to which reference is made in our "Parliamentary Intelligence," was raised by the Chairman (Lord Rosebery). He said that it would, of course, be in the recollection of the members that at the previous meeting they had adopted a resolution to the effect that they should give their support to the Coal Duties Bill before the Select Committee of the House appointed to consider it. But, under the Act of Parliament which controlled their action in such matters, the Council were not permitted to appear by Counsel before a Parliamentary Committee, except in opposition to a Bill. The Council did not oppose the Bill. Their desire was, on the contrary, to give it their support. It would be seen, therefore, that the resolution which the Council had passed could not be carried into effect. He suggested they should rescind the resolution authorizing them to appear before the Committee by Counsel; and the suggestion was adopted.

THE BARNET LOCAL BOARD AND THEIR ELECTRIC LIGHTING CONTRACTOR.—At the meeting of the Barnet Local Board last Tuesday, the Lighting Committee submitted their report, recommending that the account of the electric lighting contractor (Mr. Joel), amounting to £95 17s., for 71 lamps for three months, be paid. This recommendation, it was stated, had been arrived at after a long discussion—Mr. James dissenting. Mr. James said his reason for dissenting was that he did not believe the Board were getting what the contractor had agreed to give them; and he wished to have a small deduction made in order to "earmark" the account. After some remarks, it was decided to pay the account. The Clerk read the draft of a letter in reply to one from Messrs. Ingledew, Ince, and Co., dated the 14th ult. (see *ante*, p. 1005), in which, it may be recollected by our readers, they complained of the resolution passed by the Board, declining to assist Mr. Joel in obtaining a Provisional Order, which would enable him to put the wires underground as required by the contract. The principal points in the draft were that Mr. Joel would not at present be called upon to lay the wires underground—the Board being disinclined to give him permission to break up the streets for this purpose; and they therefore released him from the obligation. At some future time, when affairs were more satisfactory, the Board might be induced to consider an application for a Licence extending over the term of the contract. It was agreed that the letter should be written; the Chairman remarking that he thought it expressed the feelings of the Board.

CLECKHEATON LOCAL BOARD GAS SUPPLY.—Mr. J. Armitage, Clerk to the Cleckheaton Local Board, has prepared the annual statement in connection with the gas undertaking for the year ending the 25th of March last. The quantity of gas made was 59,685,000 cubic feet; being an increase over the previous year of 2,671,000 cubic feet, or 4·68 per cent. The gas sold, supplied for public lighting, and consumed at the works was 53,252,300 cubic feet; and the amount unaccounted for, 6,432,700 cubic feet. The leakage was 10·77 per cent., against 9·97 per cent. in the previous year. The consumption of coal was 5835 tons—being an increase of 185 tons over the previous year; and the cost was 102·64d. per ton, as against 101·94d. the year before. From each ton of coal carbonized there was produced 10,228 cubic feet of gas, being a decrease of 233 cubic feet. The residuals realized £1343, or 52·3 per cent. upon the cost of coal—an increase of 10·74 per cent. There had been 9126 cubic feet of gas supplied per ton of coal used, which was a decrease of 291 cubic feet as compared with the previous year. The capital employed is £33,660, equal to 12s. 7½d. per 1000 cubic feet of gas accounted for, being a decrease of 1s. 0½d; £1000 had been paid to the sinking fund, which now stands at £10,932. The amount of profit for the year was £3243 13s. 7½d., against £2830 16s. 9d. in the previous year; being an increase of £412 16s. 10½d. The value of the gas supplied for lighting the town free was £285; and including this sum in the calculation, the profit was equal to £10·48 per cent. upon the capital employed, against £9·87 per cent. in the previous year. The price of gas was reduced from 3s. 2d. to 3s. per 1000 cubic feet, less a discount of 10 per cent. on accounts paid within a month of demand, the reduction taking place on the 1st of January last.

SULPHATE PLANT FOR THE STOURBRIDGE GAS COMPANY.—This Company having decided to manufacture sulphate of ammonia, their Engineer (Mr. W. North), after inspecting several systems, decided to adopt that of Messrs. R. and J. Dempster, of Manchester; and the Company have ordered from this firm a complete plant capable of dealing with 20 tons of liquor per day.

BURSTING OF A TAR-TANK AT THE ASHFORD GAS-WORKS.—Shortly after five o'clock on Monday afternoon last week, a large square iron tank at the Ashford Gas-Works, containing 10,000 gallons of tar, burst with a tremendous crash; the entire east side, facing the retort-houses, being driven out to a considerable distance. So great was the force with which the tar escaped, that a 10-inch iron cylinder, weighing 4 cwt., was moved about ten yards; and portions of the tank, weighing half a ton or more, were also carried away. Some of the tar took fire under the ash-pans; but the workmen succeeded in banking it out with ashes and fire-clay. A large quantity ran down to the lowest part of the grounds. The cause of the tank bursting is attributed to the recent sudden changes of temperature. Fortunately the workmen were about to leave, and were, consequently, ready to take the necessary precautions to put an end to all danger.

MURDER AND ATTEMPTED SUICIDE BY A WATER-WORKS MANAGER.—Last Friday night, about eleven o'clock, an acrobat named Gorin, professionally known as Letine, the chief of a troupe of acrobats and bicyclists who have been performing at various music halls in London under the name of "The Wondrous Letine Troupe," was stabbed just as he was about to enter the Canterbury Theatre of Varieties in company with the other members of the troupe, and died shortly afterwards from the effects. The perpetrator of the deed was Mr. Nathaniel Curragh, Manager of the Crayford works of the Kent Water Company; and immediately after its committal he made an attempt to take his own life by shooting himself. It appears that Curragh's daughter was at one time a member of the Letine troupe; but, her health giving way, she was compelled to leave it, and a few months after doing so she died of consumption. Her father seems to have become so impressed with the idea that this was the result of cruelty on the part of Letine, that he conceived a scheme of revenge, which he carried into fatal execution last Friday. The victim leaves a wife and child. The unhappy Curragh, who also has a wife and family, lies, under arrest, in St. Thomas's Hospital; but no fatal result is anticipated from his attempt at suicide.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For STOCK MARKET INTELLIGENCE, see *ante*, p. 1170.)

Issue.	Share	When ex-Dividend.	Dividend on Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	11 Apr.	10½	Alliance & Dublin 10 p. c.	10	18–19	..	5 10 6
100,000	10	,,	7½	Do. 7 p. c.	10	13–14	..	5 7 2
800,000	100	2 Jan.	5	Australian (Sydney) 5% Deb.	100	111–113	..	4 8 6
100,000	20	30 May	10	Bahia, Limited	20	23–25	..	8 0 0
200,000	5	15 May	7½	Bombay, Limited	5	7–7½	..	5 0 0
40,000	5	,,	7½	Do. New	4	5–5½	..	5 9 1
880,000	Stck.	14 Feb.	11½	Brentford Consolidated	100	229–234	..	5 0 5
125,000	,,	,,	8½	Do. New	100	167–172	..	5 1 9
230,000	20	14 Mar.	10½	Brighton & Hove, Original	20	43–45	..	4 13 4
830,000	20	28 Mar.	11½	British	20	45–47	..	4 15 9
50,000	10	14 Mar.	11	Bromley, Ordinary 10 p. c.	10	20–22	..	5 0 0
89,000	10	,,	8	Do. 7 p. c.	10	13½–14½	..	5 10 4
328,750	10	30 May	10	Buenos Ayres (New) Limited	10	15½–16½	..	6 1 2
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	107–110	..	5 9 1
150,000	20	28 Feb.	8	Cagliari, Limited	20	25–27	..	5 18 6
550,000	Stck.	11 Apr.	13½	Commercial, Old Stock	100	263–268	−2	5 2 7
130,000	,,	,,	10½	Do. New do.	100	213–218	..	4 18 8
130,000	,,	28 Dec.	4½	Do. 4½ p. c. Deb. do.	100	123–128	..	3 10 3
557,320	20	14 June	13	Continental Union, Limited	20	46–48*	..	5 8 4
242,680	20	,,	13	Do. New '69 & '72	14	32½–33½*	..	5 8 5
200,000	20	,,	10	Do. 7 p. c. Pref.	20	37–39*	..	5 2 6
75,000	Stck.	28 Mar.	10	Crystal Palace District	100	204–208	..	4 16 2
234,060	10	30 Jan.	13	European, Limited	10	25½–26½	..	4 18 1
120,030	10	,,	13	Do. New.	7½	17½–18½	..	5 5 3
354,060	10	,,	13	Do. do.	5	12½–13½	..	4 16 3
5,468,600	Stck.	14 Feb.	13	Gaslight & Coke, A, Ordinary	100	257–261	..	4 19 8
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	100–105	..	3 16 3
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	257–262	..	3 16 4
80,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	123–128	..	3 18 1
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	182–187	..	4 0 4
1,900,000	,,	,,	7	Do. H, 7 p. c. max.	100	165–170	..	4 2 2
468,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	255–260	..	3 16 11
1,051,150	,,	14 June	4	Do. 4 p. c. Deb. Stk.	100	117–120*	..	3 6 8
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	125–128*	..	3 10 3
650,000	,,	,,	6	Do. 6 p. c. do.	100	170–173*	..	3 9 4
3,600,000	Stck.	15 May	10	Imperial Continental	100	205–209	..	4 15 8
75,000	5	14 June	6	Malta & Mediterranean, Ltd	5	5–5½*	..	5 9 1
560,000	100	1 Apr.	5	Met. of Melbourne, 5 p.c. Deb.	100	113–115	..	4 6 11
541,920	20	14 June	6	Monte Video, Limited	20	19½–20½*	..	5 17 1
150,000	5	30 May	10	Oriental, Limited	5	9½–9¾	..	5 2 7
60,000	5	28 Mar.	7	Ottoman, Limited	5	6¾–6¾	..	5 3 8
166,870	10	16 Jan.	4	Pará, Limited	10	5½–6	..	6 13 4
420,000	100	2 May	6	People's Gas of Chicago—1st Mtg. Bds.	100	103–107	..	5 12 1
500,000	100	1 June	6	2nd Do.	100	93–100	..	6 0 0
100,000	10	26 Apr.	10	San Paulo, Limited	10	16–17	..	5 17 8
500,000	Stck.	28 Feb.	16½	South Metropolitan, A Stock	100	317–322	..	5 0 11
1,350,000	,,	,,	12½	Do. B do.	100	235–240	−2	5 1 0
141,500	,,	,,	13½	Do. C do.	100	260–270	..	4 18 1
600,000	,,	28 Dec.	5	Do. 5 p. c. Deb. Stk.	100	138–141	..	3 10 11
60,000	5	28 Feb.	11½	Tottenham & Edm'ntn, Orig.	5	11–13	..	4 8 5
				WATER COMPANIES.				
717,467	Stck.	14 June	9½	Chelsea, Ordinary	100	264–269*	..	3 10 8
1,720,580	Stck.	11 Apr.	7½	East London, Ordinary	100	206–210	..	3 11 5
700,000	50	14 June	9	Grand Junction	50	120–124*	..	3 12 7
708,000	Stck.	14 Feb.	10½	Kent	100	272–277	..	3 15 9
1,043,800	100	28 Dec.	9	Lambeth, 10 p. c. max.	100	255–260	..	3 9 8
406,200	100	,,	7½	Do. 7½ p. c. max.	100	201–206	+1	3 12 10
200,000	Stck.	28 Mar.	4	Do. 4 p. c. Deb. Stk.	100	120–123	+2½	3 5 0
500,000	100	14 Feb.	12½	New River, New Shares	100	350–355	..	3 8 4
1,000,000	Stck.	30 Jan.	4	Do. 4 p. c. Deb. Stk.	100	126–129	..	3 2 0
902,300	Stck.	13 Dec.	6	S'thwk & V'xhall, 10 p.c. max.	100	174–178	..	3 7 5
126,500	100	,,	6	Do. 7½ p. c. do.	100	165–170	+1	3 10 7
1,155,066	Stck.	14 June	10	West Middlesex	100	261–265*	..	3 15 6

*Ex div

GWYNNE & CO., ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C.

GWYNNE & BEALE'S PATENT GAS EXHAUSTERS & ENGINES.

Telegrams: "GWYNNEGRAM, LONDON." Telephone No. 2698.

Exhausters of nearly all sizes in Stock.

Prize Medals at all the Great International Exhibitions.

Exhausters equal to a total capacity of more than 26,000,000 cubic feet passed per hour have been supplied by us.

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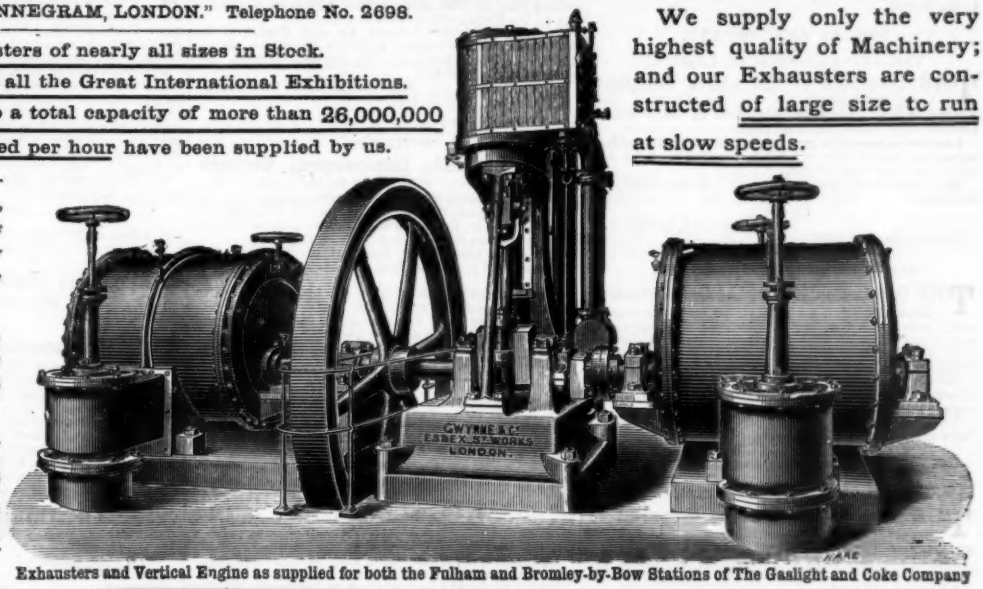
We supply only the very highest quality of Machinery; and our Exhausters are constructed of large size to run at slow speeds.



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O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.
Gas Purification and Chemical Company, Limited, Palmerston Buildings, Old Broad Street, London, E.C.
JOHN WM. O'NEILL, Managing Director.

ANDREW STEPHENSON, Agent for the GAS PURIFICATION AND CHEMICAL COMPANY, Limited, Palmerston Buildings, Old Broad Street, LONDON, E.C.

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JOHN ROMANS & SON, EDINBURGH. Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS AND WATER WORKS.
Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, / No. 54, BERNARD STREET, LEITH, } SCOTLAND

SULPHATE of Ammonia Lead Work and Fittings. Lead Burner. Tanks and Saturators made and repaired on the shortest notice.
Address P. J. DAVIES, 78, Earl's Court Road, Kensington, LONDON.

SULPHURIC ACID, B.O.V., for Sulphate of Ammonia Making. Guaranteed clear, of full strength, and to produce a fine white-coloured salt, Delivered in carboys or railway tank waggons.
For prices and terms address BALE, BAKER, AND Co., 120 & 121, Newgate Street LONDON.

ADVERTISEMENT NO. 1685.

APPLICANTS for this Appointment are respectfully informed that the VACANCY is now FILLED; and the Advertisers thank them for their Communications.

ADVERTISER desires an Appointment as MANAGER or SECRETARY'S CLERK. Has a knowledge of Bookkeeping upon the Double-entry System, and is both a good Correspondent and Accountant. In present Situation nearly Five years. First-class testimonials and references.
Address No. 1717, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

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THE Manager and Secretary of a Water- Works desires RE-ENGAGEMENT. Has life-long experience, and is thoroughly qualified to take full charge of any Water-Works, both indoor and out-door work; experience in both large Corporations and Limited Company. Prepared to give the highest references, both as to qualifications and character, and most satisfactory reasons for desiring re-engagement. Security to any amount.
Address No. 1716, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

COUNTY BOROUGH OF SALFORD.

THE Gas Committee propose to hold shortly an EXHIBITION OF GAS-FIRES, COOKING-STOVES, GAS-ENGINES, BURNERS, &c., in Peel Park, Salford.
Applications for space from persons desirous of exhibiting to be made to the Gas Engineer, Gas Offices, Bloom Street, Salford.
By order,
SAML. BROWN, Town Clerk.
Town Hall, Salford, June 22, 1889.

TIMMIS & CO., of STOURBRIDGE Make only the best quality of FIRE-CLAY RETORTS, BRICKS, TILES, & LUMPS. Also SPECIAL SILICA BRICKS, to stand great heats. All descriptions kept in Stock.
For Prices apply to JAMES LAWRIE AND Co, 1, Whittington Avenue, Leadenhall Street, E.C., Sole Agents for London and District.
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W. C. HOLMES & Co., Huddersfield, AND 80, CANNON STREET, LONDON, Contractors for Gas-Works complete, Makers of Gas-holders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.
*** See Advertisement p. 1192 of this week's issue.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award. Melbourne Exhibition, 1889, for Wet and Dry Gas-Meters, Station Meters, and Governors, Pressure-Gauges, Street Lamps, and Pillars, &c.
Telegraphic Address: "Braddock, Oldham."

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ROBERT BRUCE FITZMAURICE, 9, Crosby Square, London, E.C., Shipping Agent to several Foreign Gas Companies, is prepared to attend to the Forwarding and Insurance of Goods for Foreign and Colonial Gas Companies, &c., and Gas Plant Manufacturers.
For Rates of Freight, apply as above.

WANTED, a Situation in Gas or Water Works as FOREMAN or FITTER. Has been used to the entire charge of small Works—fifteen Retorts and two 15-horse power Pumping-Engines. Twenty years' good character.
Apply to DAVID DENNY, Board of Health Foreman, Ely, CAMBS.

WANTED, immediately, a Main and SERVICE LAYER; also a good general FITTER for inside Work.
Apply, by letter, to No. 1718, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

STATION METER.

WANTED, a Station Meter, with 4-inch Connections, and in good going order.
Apply to JAMES CAMPBELL, Writer, SALTCOATS.

WANTED—Any Gas Company having for Sale one LIVESEY WASHER, and one KIRKHAM'S SCRUBBER for 500,000 feet per day, will please communicate with Mr. LONGWORTH, Gas Offices, GUILDFORD.

THE Executor of the late Mr. Spice has for sale VOLUMES I. TO XLI. of the "JOURNAL OF GAS LIGHTING" bound in Covers, and the remaining Numbers up to date unbound.
Address JOHN WATKINSON, 21, PARLIAMENT STREET, S.W.

FOR SALE—One of Anderson's Patent ENGINES and EXHAUSTERS combined, to pass 5000 cubic feet of Gas per hour. In thorough order. Can be seen at work at the Gas-Works, Chichester, Sussex. Coming down to be replaced by one of greater capacity.
For further particulars apply to R. S. CHURCH, Secretary, Gas-Works, CHICHESTER.

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BALE, BAKER, & CO., direct Importers from Ireland. Sample and Price on application. Spent Oxide and Sulphate of Ammonia purchased.
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FOR Gas, Steam, and Water; Galvanized, White Enamelled, and Hydraulic Tubes and Co.
JOHN SPENCER, Globe Tube Works, WEDNESBURY, and 14, Great St. Thomas Apostle, LONDON.

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JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID for making SULPHATE OF AMMONIA of high quality and colour. *Delivery in Railway Tank-Wagons or Carboys.*
Highest References and all particulars supplied on application.

HUTCHINSON BROTHERS, Barnsley, Gas Engineers and Contractors, Makers of Gas-Meters and General Gas Apparatus, Sulphate of Ammonia Plant, Tools, and Sundries.
*** See large Advertisement in last week's issue, page 1116.

JOHN RILEY & SONS, Chemical Manu. facturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

FOR SALE—A 5000 cubic feet per hour ROTARY EXHAUSTER, in thorough good order. Being removed for a larger one. May be seen working up to the end of June on application to the Resident Foreman.
Apply to the GAS-WORKS, Uxbridge, MIDDLESEX.

SPIGOT AND FAUCET PIPES.

FOR SALE—299 Pipes, 10¼ in. diameter, 18 ft. 1½ in. useful length, coated; vertically cast. Average weight, about 6 cwt. 3 qrs. 4 lbs. All quite new, and proved to fifteen Atmospheres. Suitable for either Water or Gas. Can be easily laid with 10-inch Pipes by using diminishing piece.
Apply No. 1719, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ULVERSTON LOCAL BOARD.

TO IRONFOUNDERS.

THE Gas and Water Committee invite TENDERS for the supply of 5-inch and 4-inch T. and B. PIPES.
Further particulars may be obtained on application to the undersigned.
JNO. SWAN,
Engineer and Manager.
June 17, 1889.

GAS-PIPES.

THE Widnes Local Board are prepared to receive TENDERS for the supply of about 25 tons of 3-inch and 25 tons of 4-inch Spigot and Socket GAS-PIPES.
Specifications and other particulars may be obtained from Mr. Carr, Gas-Works, Widnes.
Tenders to be endorsed "Gas-Pipes," and delivered to the undersigned not later than Noon on the 1st of July.
The Board do not undertake to accept the lowest or any tender.
JAS. T. ALLEN, Clerk.
Town Hall, Widnes, June 17, 1889.

OLD PLANT.

THE East Dereham Local Board are prepared to receive TENDERS for the purchase of GAS-WORKS PLANT, and a quantity of SCRAP IRON.

Particulars may be obtained from B. H. Vores, Clerk to the Board.

MORLEY GAS COMPANY.

TAR AND AMMONIACAL LIQUOR.

THE Directors of the above Company invite TENDERS for the surplus TAR and AMMONIACAL LIQUOR produced at their Works for One year, ending June 30, 1890.

Further information can be obtained from the undersigned, to whom endorsed tenders must be sent not later than Saturday, July 6.

The highest or any tender will not necessarily be accepted.

By order,
J. Hemingway, Secretary.

Morley, June 22, 1889.

COCKERMOUTH LOCAL BOARD.

THE Gas Committee of the Cockermouth Local Board invite TENDERS for the supply and delivery at the Cockermouth Goods Station of about 1800 tons of GAS COAL, in such quantities as may be directed, during Twelve months ending July, 1890.

Parties tendering must specify the kind of Coals offered, the Pits from which they are raised, and supply an Analysis.

Tenders, endorsed "Gas Coal," to be delivered not later than the 6th of July next.

E. W. Smith, Manager.

Gas-Works, Cockermouth, June 22, 1889.

BOROUGH OF ILKESTON.

THE Gas Committee are prepared to receive TENDERS for the supply and delivery at their Gas-Works of 4500 tons of GAS COAL.

Conditions and form of tender may be had of the Manager (Mr. F. C. Humphrys), the Gas-Works, Rutland Street, Ilkeston.

Sealed endorsed tenders must be delivered to the undersigned by Five o'clock in the afternoon of Monday, the 8th day of July next.

The Committee do not bind themselves to accept the lowest or any tender; and they reserve to themselves the right to divide the quantity above-named into two or more contracts.

By order,
Wright Lissett, Town Clerk.

Town Hall, Ilkeston,
June 13, 1889.

GIBRALTAR GAS COMPANY.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Directors of the above Company invite TENDERS for One or Two years' supply of screened GAS COAL, yielding about 10,000 cubic feet of 16-candle Gas per ton.

The quantity required will be about 4000 tons each year.

Tenders to include Freight, Insurance, and all other Charges, and the Coal to be delivered, by Sailing Vessel (carrying from 200 to 500 tons), in Rosia Bay, Gibraltar, as required, commencing in August next.

Tenders, endorsed "Tender for Gas Coal," to be sent to the undersigned, so as to be received not later than July 20, 1889.

Copies of conditions, &c., will be forwarded on application.

Benjamin Carver, Jun.,
Chairman of the Board of Directors.

Gibraltar, June 13, 1889.

CIRENCESTER GAS COMPANY, LIMITED.

THE Directors are prepared to receive TENDERS for the supply of from 2000 to 3000 tons of best screened GAS COAL, delivered free to the Watermoor Station of the Midland and South-Western Junction Railway Company, during the Twelve months ending June 30, 1890, at such times and in such quantities as the Manager may direct.

Tenders, marked "Tenders for Gas Coal," to be delivered at the Company's Offices, 12, Silver Street, Cirencester, on or before the 4th day of July next. No special form of Tender.

John P. Beecham, Secretary.

Cirencester, June 11, 1889.

BETHESDA.

THE Bethesda Improvement Commis- sioners invite TENDERS for the supply of GAS COAL for a period of One year, commencing from the 1st day of August, 1889, to the 31st day of July, 1890; to be delivered at the Bethesda Railway Station in such quantity and at such times as may be required.

The Coal must be of the best of its kind, well screened, and free from Bats, Pyrites, or other Impurities.

Parties tendering must give full information as to the Coal offered, and the Colliery from which they propose to supply; and the tenders to be sent to me not later than the 1st day of July, 1889.

The Commissioners do not bind themselves to accept the lowest or any tender.

R. Benjamin Evans,
Clerk to the Commissioners.

Rachub, near Bangor, June 18, 1889.

CORPORATION OF STOCKPORT.

Contract No. 1.

THE Gas Committee are prepared to re- ceive TENDERS for the Excavating and Building of a BRICK TANK, 150 feet in diameter, and 33ft. 6in. deep, at their Portwood Gas-Works, Stockport; also a BRICK BOUNDARY WALL as per drawings.

Drawings and specifications may be seen upon application at the Portwood Works.

Sealed tenders to be sent in on or before the 9th day of July, 1889, addressed to the Chairman of the Gas Committee, endorsed "Tender for Tank and Wall."

The Committee do not bind themselves to accept the lowest or any tender.

Further particulars may be obtained on application to the Engineer.

James Jacques,
Engineer and Manager.

Millgate Works, June 19, 1889.

TO TAR DISTILLERS ETC.

THE Directors of the Sheffield United Gaslight Company are prepared to receive TENDERS for the purchase of the surplus TAR made at their Neepsend and Effingham Street Works for the period of Twelve months from the 1st of July next.

The quantities will be, approximately: Neepsend, 3000 tons; Effingham Street, 1500 tons.

At Neepsend the tar will be loaded into tanks on the Company's Siding, on the Manchester, Sheffield, and Lincolnshire Railway, or into Barrel-Carts on the Works; and at Effingham Street into Barrel-Carts only.

Forms of tender and conditions of contract may be obtained from the undersigned, to whom tenders, endorsed "Tender for Tar," must be delivered on or before Tuesday, July 2.

The Directors do not bind themselves to accept the highest or any tender.

Hanbury Thomas,
General Manager.

Commercial Street, Sheffield,
June 12, 1889.

CORPORATION OF LEICESTER.

(Aylestone Road Works.)

PURIFIERS.

Section No. 2. Contract No. 15.

THE Gas Committee of the above Cor- poration are prepared to receive TENDERS for the Manufacture, Delivery, and Erection complete of eight CAST-IRON PURIFIERS, 32 feet square, together with the necessary Wrought-Iron Covers, Valves, Connections, &c., at their Aylestone Road Works.

Drawings may be seen, and specification and form of tender obtained, upon application to the Engineer, and on payment of the sum of £5, which amount will be returned upon the receipt of a *bond fide* tender.

Tenders, addressed to Mr. Councillor Lennard, Chairman, and endorsed "Tender for Purifiers," to be delivered at these Offices not later than Eleven o'clock a.m. on Saturday, July 6 prox.

The Committee do not bind themselves to accept the lowest or any tender.

Alfred Colson, C.E.,
Engineer and Manager.

Gas Offices, Millstone Lane,
Leicester, June 19, 1889.

COUNTY BOROUGH OF SALFORD.

(Gas Department.)

TAR.

THE Gas Committee of the Salford Cor- poration invite TENDERS for the purchase and removal of the surplus TAR to be produced at their Bloom Street, Regent Road, and Liverpool Street Works in Twelve months, from July 18 next.

The approximate quantity will be 4500 tons.

Forms of tender and conditions of contract may be obtained on application to the Gas Engineer, Gas Offices, Bloom Street, Salford.

Sealed tenders, endorsed "Tender for Tar," addressed to the Chairman of the Gas Committee, must be delivered to me on or before Thursday, the 11th prox., at Five o'clock in the Evening.

By order,
Saml. Brown, Town Clerk.

Town Hall, Salford, June 22, 1889.

COUNTY BOROUGH OF SALFORD.

TENDERS FOR GENERAL STORES.

THE Gas Committee of the Corporation are prepared to receive TENDERS for the supply of the following MATERIALS, viz.—

1. Iron and Steel.
2. Tin Sheets, &c.
3. Lead and Composition Pipes, Glass, and Pig Lead.
4. Bolts, Nuts, Rivets, &c.
5. Iron Castings.
6. Brass Meter Taps, Keys, &c.
7. Gas Tubing and Fittings.
8. Gas-Meters.
9. Paints, &c.
10. Chandlery.
11. Oils, &c.
12. Cotton Waste.
13. India-rubber Sheeting, Rings, &c.
14. Lias Lime and Cement.
15. Timber.
16. Rope, Tarred and Spun Yarn.
17. Haulage.
18. Horse Provender.
19. Veterinary Expenses.
20. Brushes and Besoms.
21. Lamp Pillars and Head Frames.

In such quantities as may be required during the Twelve months following the acceptance of tender.

Forms of tender and all further information may be obtained on application to the Engineer, Gas Offices, Bloom Street, Salford.

Sealed tenders, endorsed "Tender for Miscellaneous Goods," together with samples of the Goods offered, addressed to the Chairman of the Gas Committee, Town Hall, Salford, must be delivered to me on or before the 11th prox., at Five o'clock in the Evening.

By order,
Saml. Brown, Town Clerk.

Town Hall, Salford, June 22, 1889.

C. & W. WALKER.

GASHOLDERS; PURIFIERS; PURIFYING MACHINES;

CO_2 AND TAR-EXTRACTING WASHERS; SCRUBBERS;

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"FORTRESS LONDON," "FORTRESS DONNINGTON."—Telegraphic.

THE Clevedon Gas Company invite TENDERS for 5000 tons of GAS and HOUSE COAL, to be supplied as required during the next Twelve months. Parties tendering must specify the description and qualities of the respective Coals, with an analysis.

For particulars and forms of tender, apply to the Manager, S. DAWES, Gas-Works, CLEVEDON.

June 11, 1889.

GLASGOW CORPORATION GAS.

RESIDUAL PRODUCTS FOR SALE.

THE Glasgow Corporation Gas Com- missioners are prepared to receive TENDERS for the purchase of the TAR and AMMONIACAL LIQUOR produced at the Dalmarnock Gas-Works from and after the 1st of September, 1889.

Forms of tender, on which offers must be made, and copies of the terms and conditions upon which the Products are to be sold, may be had on application to the Manager, at the Gas-Office, 42, Virginia Street, Glasgow; and offers, endorsed "Tender for Dalmarnock Residual Products," will be received by the Subscriber on or before Tuesday, the 9th prox.

The Commissioners do not bind themselves to accept the highest or any tender.

J. D. MARWICK, Town Clerk.

City Chambers, Glasgow,
June 12, 1889.

LEIGH LOCAL BOARD.

THE Gas Committee of the Leigh Local Board invite TENDERS for the supply and erection of a TOWER SCRUBBER, 44 feet high and 7 feet diameter.

The Committee also invite TENDERS (with full descriptions) for the supply and erection of SULPHATE PLANT.

Further particulars may be had from the undersigned.

Sealed tenders, endorsed "Scrubber" or "Sulphate Plant," and addressed to Mr. Alderman Thorp, Chairman, to be delivered at the Town Hall, Leigh, on or before Monday, the 8th of July next.

The lowest or any tender not necessarily accepted.

ALFRED T. FLETCHER,
Engineer and Manager.

Gas-Works, Leigh, Lancs.,
June 11, 1889.

BOROUGH OF BURTON-UPON-TRENT.

RESIDUAL PRODUCTS.

THE Gas Committee of the Burton-upon Trent Corporation invite TENDERS for the purchase of the AMMONIACAL LIQUOR and surplus TAR to be produced at their Works during Twelve months, from the end of July next.

Probable quantity of Coal carbonized during the Twelve months, 20,000 tons.

The Liquor and Tar will be delivered free into Contractor's Tank-Trucks on the Gas-Works Railway Siding.

The Strength of the Liquor will be tested by Twaddel's Hydrometer; and persons tendering are requested to state the price per ton to be paid for each 1° of Strength from 3½° to 8°.

Payments, net cash monthly.

Separate tenders for Liquor and Tar, sealed, and endorsed "Tender for Residual Products," are to be delivered to me at or before Ten a.m., on Saturday, the 29th of June inst.

The highest or any tender will not necessarily be accepted.

F. L. RAMSDEN,
Manager and Engineer.

Gas-Works, Burton-upon-Trent,
June 8, 1889.

NOTICE.

THE Office of the Paignton Gaslight, Coke, and Coal Company, Limited, now at Fisher Street, will, after the 24th of June next, be REMOVED to KIRKHAM STREET, PAIGNTON.

The MANAGER and SECRETARY for the future will be Mr. W. H. ROBERTS, to whom all Letters must be addressed.

(Signed)
HENRY MURCH, Secretary.

Paignton, June 12, 1889.

Price 2s. per dozen, or 10s 6d. per 100, post free.

CONSPIRACY and Protection of Pro- perty Act. It is required, under a Penalty of FIVE POUNDS, that a Printed Copy of the 4th Section of this Act shall be posted up at all Gas-Works, in a conspicuous place, where the same may be conveniently read by the persons employed thereat.

Printed copies of this Section, in large type, on broad sheets, may be obtained of WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

*** *The Act extends to Scotland and Ireland.*

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their Inventions may be secured for Twelve months; or LETTERS PATENT, which are granted for Fourteen Years.

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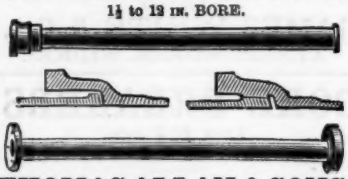

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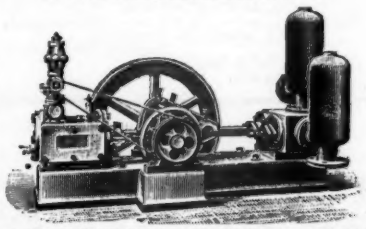

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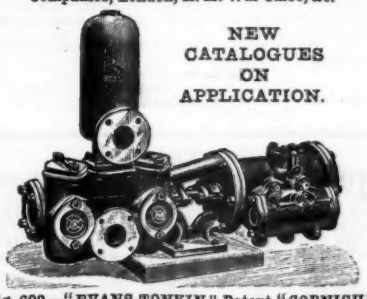

Fig. 600.—"EVANS-TONKIN" Patent "CORNISH" DIRECT-ACTING STEAM-PUMP. NO TAPPETS.

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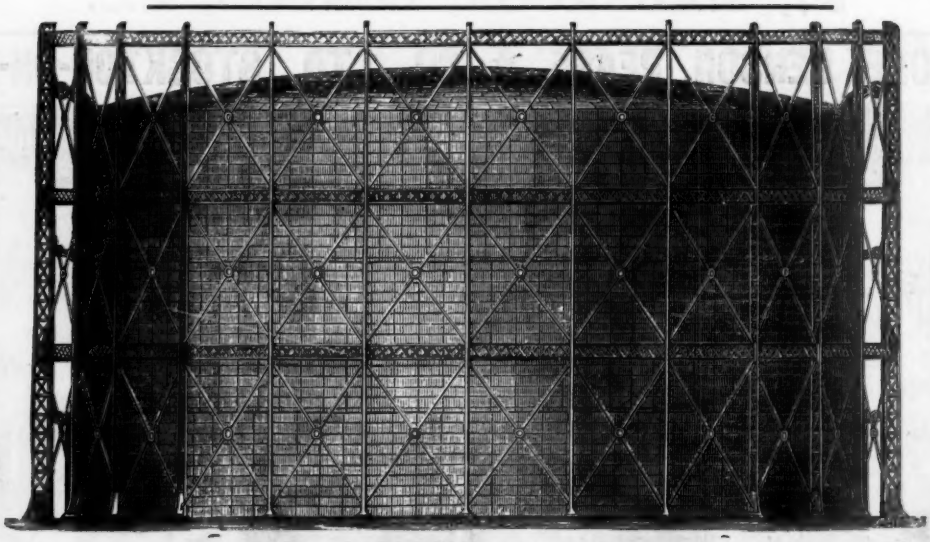

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Dust Coal on this Furnace will raise within 5 per Cent. of the same quantity of steam as an equal weight of large coal (of the same quality) on an ordinary furnace.

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Over **6 lbs.** of water per square foot of **heating surface** of boiler per hour has been easily evaporated by these Furnaces; and, being forced blast, no chimney is required to do this.

EVAPORATIVE DUTY.

As much as **11 lbs.** of water per pound of **Coal Dust** has been evaporated by the use of this Furnace in an ordinary Cornish Boiler, and over **7 lbs.** of water per pound of **Coke Dust.**

ECONOMY.

In many cases fuel is now used which was formerly valueless; thereby **saving the whole of the fuel bill,** and returning the first cost of the Furnaces in a very short time. Many firms, having tried them for some months, have repeated their orders; one Company having placed at intervals **10 separate orders** with us, and have now 32 Furnaces at work.

SUITABLE FOR ANY KIND OF BOILER, OLD OR NEW.

SOLE LICENSEES FOR GREAT BRITAIN—

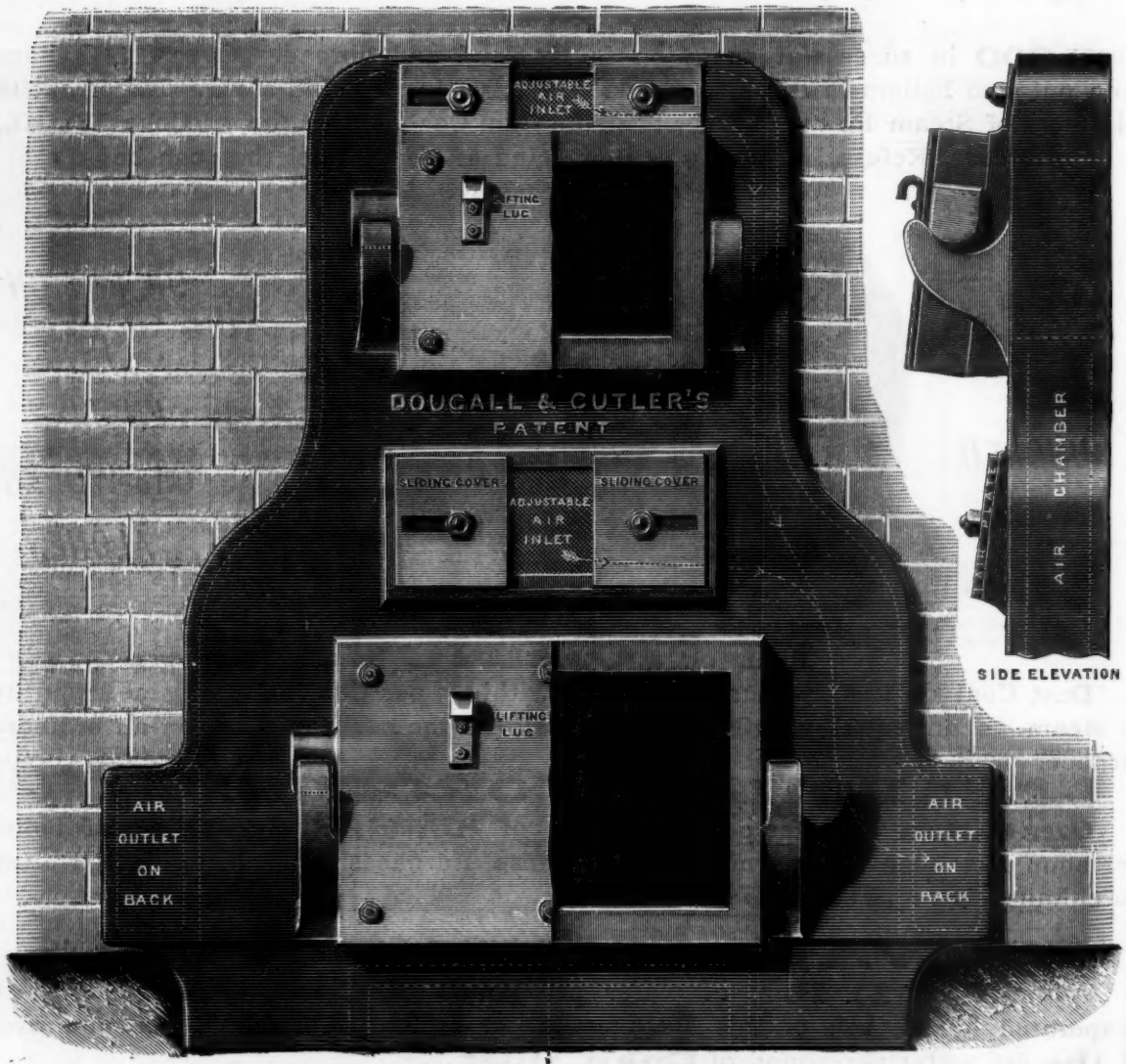
BRYAN DONKIN & Co., LIMITED,

ENGINEERS,

SOUTHWARK PARK ROAD, BERMONDSEY, LONDON.

ESTIMATES FURNISHED FOR NEW STEAM-BOILERS FITTED WITH PERRET'S FURNACES.

DOUGALL & CUTLER'S
Patent Furnace Frame
WITH PATENT DOOR ATTACHMENTS.



The Frame is provided with a Chamber through which the Air required for the Furnace traverses, entering at the Adjustable Apertures shown, and passing into the Furnace at the Outlet Branches near the bottom of the Frame, as indicated.

This Air Jacket, while utilizing heat that would otherwise be wasted, keeps the Frame sufficiently cool, and avoids the usual rapid wear and tear.

The Doors are not hinged, but held in position by specially formed wedge projections and seatings cast on doors and frame, as shown; and thus a degree of lightness is maintained quite impossible with hinged doors.

They are readily removed and replaced in position by a lever upon a light carriage.

These Doors can be fitted to Furnace Frames of any pattern—without the Air Jacket, if desired—either with single or double doors.

Further Particulars can be obtained from Mr. A. DOUGALL, Gas-Works, Tunbridge Wells, or from the SOLE MAKERS,

SAMUEL CUTLER & SONS, MILLWALL, LONDON.

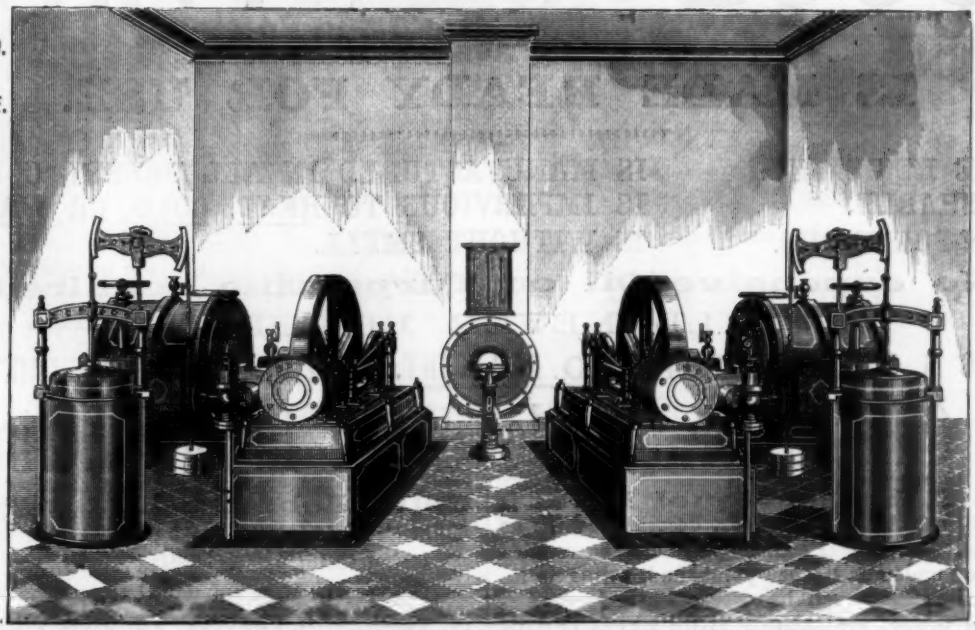
R. DEMPSTER & SONS, Ltd.,

ESTABLISHED 1855.

ROSE MOUNT GAS ENGINEERING WORKS,

ELLAND, YORKS.

NO HIGH SPEED. STEADY GAUGE.



NO SLIP. NO OSCILLATION.

PLAIN AND ORNAMENTAL PILLARS AND BRACKETS.

PLAIN AND ORNAMENTAL PILLARS AND BRACKETS

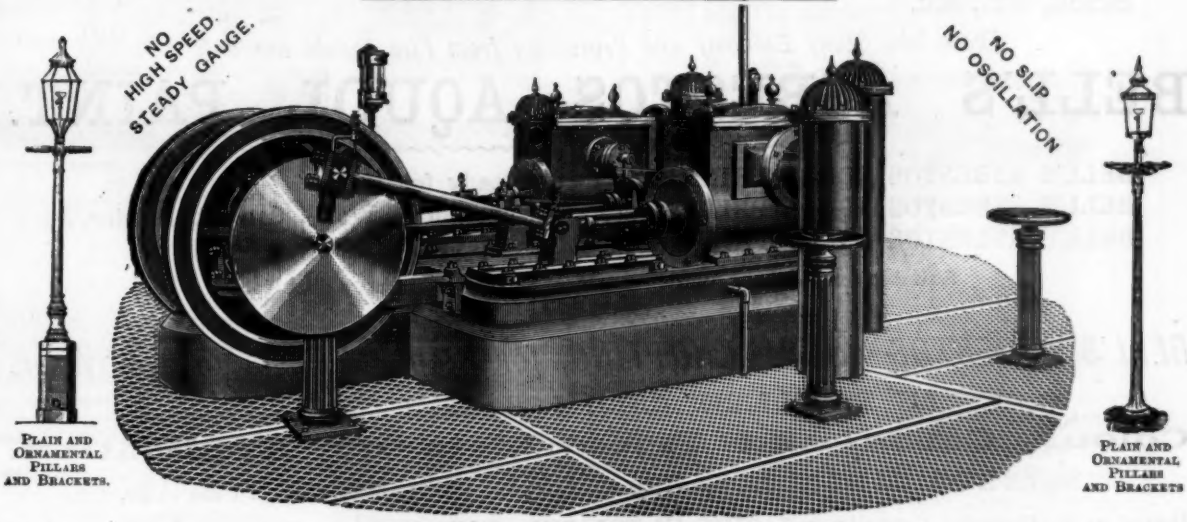
The above Woodcut is taken from a Photo of Two Sets erected at Wigan, July, 1888, each of which is capable of passing 80,000 cubic feet of Gas per hour.

The Elland Rotary Exhauster

cannot be surpassed for efficiency or superiority of workmanship.

Mr. Timmins, Engineer, Wigan, says:—

"The results I have attained with your Exhausters are most satisfactory. I have a perfect gauge; they work noiselessly; and the workmanship and material are excellent throughout."



PLAIN AND ORNAMENTAL PILLARS AND BRACKETS.

PLAIN AND ORNAMENTAL PILLARS AND BRACKETS

— DEMPSTER'S —

Direct-acting Reciprocating Pump Exhausters,

Sole Makers of Plant for the Manufacture of OXYGEN (Brin's Patent Process) as applied to the REVIVIFICATION of OXIDE *in situ*.

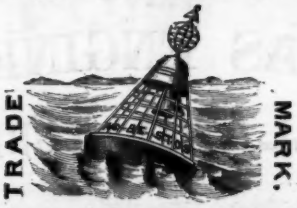
RETORTS. CONDENSERS. GASHOLDERS. PURIFIERS.
RETORT-FITTINGS. SCRUBBERS. ROOFING. VALVES, &c.

And every description of Gas and Chemical Plant.

Inquiries Solicited. Testimonials and References upon application.

Note the Address: **ELLAND, YORKS.**

BELL'S ASBESTOS AQUOL PAINT



IS MADE READY FOR USE.

IS FIRE RESISTING.
IS WASHABLE.
IS NON-POISONOUS.
IS MANUFACTURED IN ALL USEFUL COLOURS.
IS IMPERVIOUS TO HEAT, COLD, OR WATER.
IS WITHOUT SMELL.

No expensive Oil or Turpentine required.

WILL NEVER BLISTER.

HAS A COVERING CAPACITY 40 PER CENT. GREATER THAN LEAD PAINTS.

For Outside or Inside Work in any Climate.

Bell's Asbestos Aquol Paint is equally suitable for the finest decorative work as well as for general painting. It can be applied over or under any other paint, and, owing to its easy application, can be used with a large distemper brush; the SAVING THUS EFFECTED IN LABOUR BEING 50 PER CENT. OVER THAT OF LEAD PAINTS.

Bell's Asbestos Aquol Paint is susceptible of the most delicate treatment; and, owing to its perfect flatted surface, it brings up the varnish in a manner that no other paint can equal. ONE COAT OF VARNISH ON **Bell's Asbestos Aquol** IS EQUAL TO TWO COATS ON ORDINARY PAINT.

BELL'S ASBESTOS AQUOL PAINT is specially adapted for Private Houses, Exhibition Buildings, Ships, Churches, Asylums, School Boards, Railway Stations, and all work of Wood, Iron, Cement, Plaster, Stone, Brick, &c., &c.

Those who Study Economy and Protection from Fire should use only

BELL'S ASBESTOS AQUOL PAINT.

BELL'S ASBESTOS AQUOL PRIMING is made Ready for Use.
BELL'S ASBESTOS AQUOL PRIMING stops all suction of Wood, Cement, Plaster, &c.
BELL'S ASBESTOS AQUOL PRIMING should be applied to all New Work.

Suitable for Ceilings, Walls, and New Wood, and is very durable.

BELL'S ASBESTOS AQUOL KNOTTING, for Stopping Knots in New Work.

AN EXCELLENT CURE FOR DAMP WALLS.

Colour Cards and Price Lists on Application.

Supplied in Casks of 5 to 7 cwt., and Iron Drums of 28, 56, and 112 lbs., Sample Tins of 7 and 14 lbs.

Owing to its Covering Capacity, a SAVING IN FREIGHT of 40 per cent. is effected for a given surface.

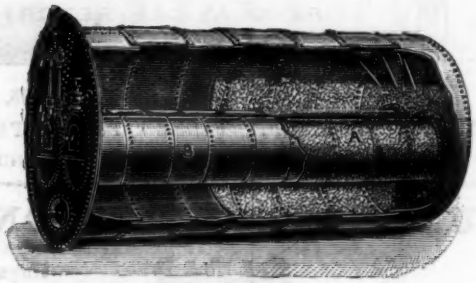
BELL'S ASBESTOS COMPANY, LIMITED,

SOUTHWARK, LONDON, S.E.

DEPÔTS—MANCHESTER: Cable Street, Blackfriars. LIVERPOOL: 2, Strand Street, James Street. CARDIFF: West Bute Street. BIRMINGHAM: 7, John Bright Street. HULL: Humber Dock Basin. GLASGOW: 35, Robertson Street. DUBLIN: 2, St. Andrew Street. BERLIN and BARCELONA.

BELL'S ASBESTOS BOILER PRESERVATIVE

Will remove Incrustation from Steam-Boilers of all kinds without chipping.



A shows Boiler Plates when incrusted.
B shows Boiler Plates when cleaned by this Composition.

Every Cask is sent out as above.

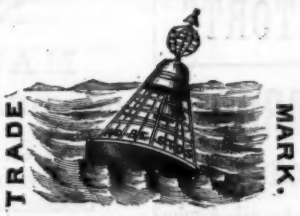
The action of this **BOILER PRESERVATIVE,** by absorbing the free oxygen that is in the water, **entirely checks pitting and corrosion.** It also disintegrates incrustation so immediately as to prevent its adhering to the plates; and the deposit falls to the bottom in a loose powder, which is easily swept out. By keeping boilers clean, a **great economy of fuel is effected,** and the danger of the plates burning is entirely obviated; thus avoiding the great risks which are inseparable from scaled plates, lengthening the life of a boiler, and **covering its own cost a hundredfold.** Whenever possible it should be used through Feed Pump or Injector, which it will also keep clear from incrustation. The small quantity required to effect its purpose makes this the most economical, and more than repays the higher price we charge for a fluid which, in the case of many other makers, is useless.

QUANTITY REQUIRED—A quarter of a pint weekly per horse power indicated; where the water is very bad rather more, or one pint for every 700 gallons of water evaporated.

BELL'S ASBESTOS CO., Ld.

DEPÔTS.
MANCHESTER: Cable St., Blackfriars.
LIVERPOOL: 2, Strand St., James St.
HULL: Humber Dock Basin.
DUBLIN, BERLIN.

SOUTHWARK,



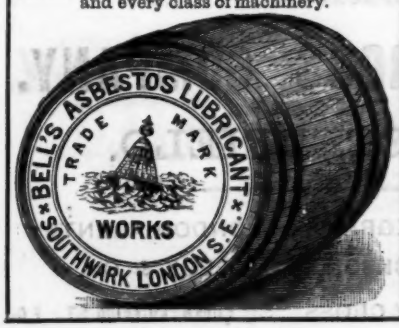
DEPÔTS.
BIRMINGHAM: 7, John Bright Street.
GLASGOW: 35, Robertson Street.
CARDIFF: West Bute Street.
And BARCELONA.

LONDON, S.E.

BELL'S ASBESTOS
YARN AND SOAPSTONE PACKING
Is the BEST LOCOMOTIVE PACKING made.

BELL'S
COMPOUND HYDRAULIC PACKING
Is specially suited for Hydraulic Machinery, Accumulators, and Ammonia and all Pumps.

BELL'S ASBESTOS LUBRICANT
Is unequalled
For Steam-Engines & Cylinders, Gas-Engines, and every class of machinery.



BELL'S ASBESTOLINE
The reputation of this Lubricant is based on the experience of thousands of users, which places it far in advance of those who rely only on mere laboratory tests.

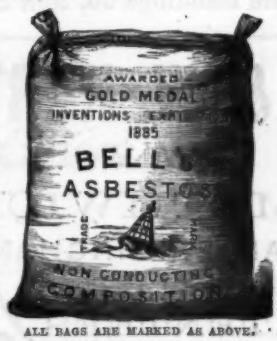
ASBESTOLINE IS THE CHEAPEST, MOST EFFICIENT, CLEANEST, MOST INODOROUS, AND SAFEST LUBRICANT.

ASBESTOLINE HAS SAVED 90 PER CENT. OVER OIL.

Has been used for all purposes, AND BEATEN ALL OTHER LUBRICANTS IN ACTUAL WORK.

BELL'S ASBESTOS
"DAGGER" PACKING
Is unequalled for every kind of Marine and Land Engine, Steam-Pumps, &c., and has proved itself to be the most efficient, durable, and economical Packing made.

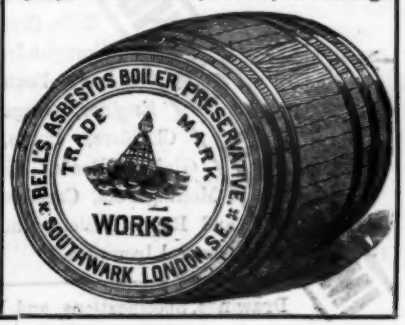
BELL'S ASBESTOS
NON-CONDUCTING COMPOSITION.
Will reduce loss by radiation, and saves 40 per cent. of fuel.
Saves its own cost in a few months.



Can be applied again after many years' service.
Is sent out dry in bags; therefore cheaper than others sent out wet.

ALL BAGS ARE MARKED AS ABOVE.

BELL'S ASBESTOS
BOILER PRESERVATIVE
Will effectually keep Boilers clean and remove any Incrustation, without injury to the Boiler, Plates, or Fittings.



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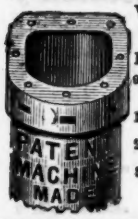
NEW HIGH-POWER GAS-LAMP, WESTPHAL'S PATENT.
MOST INTENSE WHITE BRILLIANT GAS LIGHT.
MOST ECONOMICAL, SIMPLE, AND DURABLE.
DOES NOT GET OUT OF ORDER.
RIVALS THE ELECTRIC LIGHT.
NO ALTERATION REQUIRED TO EXISTING FITTINGS.
BURNER, BEING A CIRCULAR SLIT DOES NOT CHOKE UP.

PARTICULARS & PRICES POST FREE.

HENRY GREENE & SONS,
SOLE CONSIGNEES FOR GT. BRITAIN & COLONIES,
153 TO 155, CANNON STREET,
LONDON BRIDGE, E.C.

WILLIAM INGHAM & SONS,



WORTLEY FIRE-CLAY WORKS
Near LEEDS,

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing Adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

PATENT
MACHINE-MADE GAS-RETORTS.

WILSON CARTER & PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station, or for Export, all kinds of Fuel for Gas purposes.

ADDRESS CHIEF OFFICES:

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J. & W. HORTON

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SMETHWICK,
NEAR BIRMINGHAM
(Established 50 Years),

PATENTEES
AND
MANUFACTURERS
OF

IMPROVED GASHOLDERS AND BOILERS

and Manufacturers of every description of

Gas Apparatus,

Cast and Wrought Iron Tanks, Purifiers, Condensers, Scrubbers, Retort-Lids, Cross-Bars and Screws, Wrought-Iron Boilers for Stationary, Portable, and Marine Engines, Sugar Pans, Coolers, Clarifiers, Punts, Boats, Bridges, Girders, Roofs, Cisterns, Oil-Tanks, Melting-Pots, Crucibles, Salt-Pans, Arch and Range Boilers, and every description of General Ironwork.

Drawings, Specifications, and Estimates supplied.

JOHN HALL & CO.,

STOURBRIDGE

MANUFACTURERS OF FIRE-BRICKS, LUMPS, TILES

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.
RETORTS CAREFULLY PACKED FOR SHIPMENT.
A STOCK OF DIFFERENT SHAPES ON HAND.

SULPHATE OF AMMONIA.

By Her Majesty's Royal Letters Patent.

DR. FELDMANN'S APPARATUS

The most successful and approved Apparatus known up to the present time.

FOR REFERENCES, PARTICULARS, TESTIMONIALS, AND PRICES APPLY TO THE

Sole Agents and Manufacturers,

GODDARD, MASSEY, & WARNER, ENGINEERS,
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OR TO
MAURICE SCHWAB,
96, DEANSGATE, MANCHESTER.

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GAS AND WATER PIPES

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CASTINGS OF EVERY DESCRIPTION.

MANUFACTURED BY THE

CLAY CROSS COMPANY.

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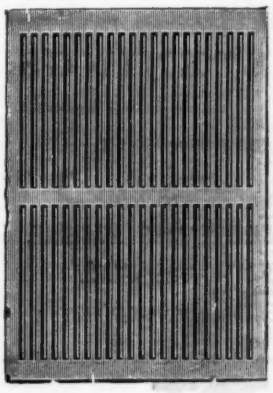
THE "LUCIENT" HIGH-POWER & DURABLE GAS-LAMP.

ALEXANDER BROWN'S PATENT.

Gives the most intense, brilliant, and steady white light yet produced from gas. A light of over 270 candles for 13 cubic feet per hour. Such results are unapproached by any other Regenerative Gas-Lamp. To be seen in operation, and full particulars obtained of

ALEXANDER BROWN & Co.,
24, GORDON STREET, GLASGOW,
90, HATTON GARDEN, LONDON, E.C.,
And 113, EMILY STREET, BIRMINGHAM.

R. & J. DEMPSTER'S



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Made from any kind of Timber, of any Size or Shape, by trained Workmen and specially-designed Machinery.
Quick delivery and accuracy guaranteed.

BOARDS FOR SCRUBBERS

Cut and fitted upon the most successful system.

GRIDS FOR SULPHATE PLANTS.

Prices moderate. Inquiries solicited. Estimates free.

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GAS PLANT WORKS,
NEWTON HEATH, MANCHESTER.

CLAYTON, SON, & CO.

ESTABLISHED A QUARTER OF A CENTURY. LIMITED.

MANUFACTURERS OF ALL KINDS OF

GASHOLDERS

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GAS PLANT

OF EVERY DESCRIPTION.

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CARSON'S PAINT

FOR

GASOMETERS and all OUTBUILDINGS

IN THE

VICINITY OF GAS-WORKS,

MIXED READY FOR USE.

This PAINT is not affected by Sulphuretted Hydrogen, Damp or Impure Air, and is specially recommended to

GAS COMPANIES.

Patterns and full Particulars Post Free. Quotations for Quantities.

THE "LA BELLE" ENAMEL,

Specially prepared for Engine-Beds and Machinery of every description. Stands the action of Mineral Oils, Heat, Gases, &c. Dries hard with a glass-like surface.

WALTER CARSON & SONS,

LA BELLE SAUVAGE YARD, LUDGATE HILL,
LONDON;
And BACHELOR'S WALK, DUBLIN.

D. HULETT & CO.

Invite attention to the following Specialities:—

PATENT STREET LAMPS,

NO PUTTY OR OTHER MATERIALS ARE REQUIRED TO SECURE THE GLASS. PRICE 9s. 9d. EACH NET.

D. Hulett's Improved Service Cleanser, for the removal of Naphthalene and other obstructions in Service-Pipes. Price 70s. net.

IMPROVED HIGH-POWER LANTERNS; PRICES ON APPLICATION.

Patentees of Improved Wet and Dry Gas-Meters.

Makers of Pressure-Gauges, Gaseliers, and every kind of Gas-Fittings for the Trade.

SHOW-ROOM AND WORKS: 55 & 56, HIGH HOLBORN, LONDON.

JOSEPH CLIFF AND SONS,

THE ORIGINAL ESTABLISHED 1795).

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS.

SPECIAL NOTICE.—Our Patent Machine-Made Retorts have now been thoroughly tested, and have proved themselves infinitely superior to those made by hand. At several large works it has been settled, beyond question, that, owing to the compactness and general excellence, more gas is sent to the gasholder from each ton of coal carbonized than is the case with hand-made Retorts.

AT THE PARIS EXHIBITION, 1878,
THREE MEDALS AND HONOURABLE MENTION
WERE AWARDED TO
JOSEPH CLIFF & SONS,
For their Various Exhibits, amongst which is a
SILVER MEDAL FOR THEIR PATENT MACHINE-MADE RETORTS AND FIRE-BRICKS,
Being the Highest Honour given for this Class.

London Wharf: No. 4, inside Great Northern Goods Station, King's Cross, N. Liverpool: Leeds Street.

WEST'S GAS IMPROVEMENT CO., LIMITED,

Engineers, Ironfounders, and Contractors,

ALBION IRON-WORKS, MILES PLATTING, MANCHESTER,

MANUFACTURERS OF

WEST'S PATENTED MACHINERY

FOR

CHARGING AND DRAWING GAS-RETORTS.

OVER **140** MACHINES AT WORK.

ADVANTAGES ATTENDING ITS USE ARE:—

INCREASED VOLUME of GAS per TON and INCREASED YIELD per Retort.—The system of breaking and distributing the coals in an even layer in the retorts effecting more perfect carbonization.

REDUCTION in LABOUR and COST of WORKING.—In Works where this System of charging and drawing Retorts is adopted, there has been effected a substantial saving in the cost of Gas Manufacture in the Retort-House; the amount saved varying in different Gas-Works from **8 PENCE** to **15 PENCE per Ton** of coal carbonized. Full particulars will be forwarded upon application to W. G. I. Company, Limited.

MANUAL CHARGING AND DRAWING MACHINES.

POWER CHARGING AND DRAWING MACHINES, driven by Wire Rope, Steam, or Compressed Air.—The power machines are applicable to circular, oval, or ⌂-shaped retorts and mouthpieces, and are the most perfect, economical, efficient, and durable machines made; they are constructed on principles founded by long and extensive experience in this special branch of gas engineering and the manufacture of gas.

Sole Makers of **CIRCULAR, OVAL,** or ⌂-shaped **MOUTHPIECES,** with Morton's Self-Sealing Lids, fitted with

KING'S PATENT FASTENINGS,

which, by a simple wedging action at each end of the crossbar, secure a very tight joint; and at the same time, by their long sliding motion, they effectually remove the tar or other matter from the surfaces of the mouthpiece and lid.

N.B.—The whole of these Fittings are made of Wrought Iron.

Estimates and further particulars forwarded upon application for Mouthpieces complete, or for Lids and Fastenings separately.

MAKERS OF THOMAS AND SOMERVILLE'S COKE-BREAKING MACHINE.

SOLE MAKERS OF WHITE'S PATENT AUTOMATIC GAS-VALVE.

Mr. JOHN WEST, M. Inst. C.E., Managing Director.

ILLUSTRATED CATALOGUE SENT UPON APPLICATION.

G. J. EVESON,

GAS COAL AND CANNEL CONTRACTOR,

PATENTEE OF

A SPECIAL COMPOUND

FOR THE CURE OF STOPPED ASCENSION-PIPES,

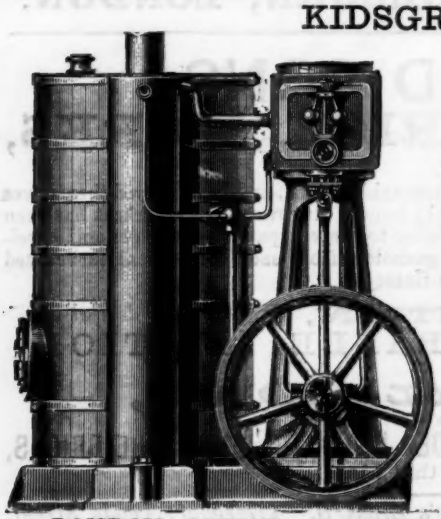
A couple of charges of which will clear a stopped pipe, and an occasional charge keeps them clean, and also increases the make per ton and the illuminating power

PRICE AND PARTICULARS ON APPLICATION.

Head Office: CORPORATION STREET, BIRMINGHAM.

RENSHAW, KING, & Co.,

KIDSGROVE, STAFFORDSHIRE,



Sole Makers and Licensees

VICTOR VACUUM ENGINE

(WASTFIELD'S PATENT),

PRIME MOVER, suitable for Tram Cars, Yachts, Hoists, Dynamos, Pumps, and Driving Machinery in Gold Mining, Crushing, Grinding, Cutting, Printing, Ventilating, Farming, &c., &c.

ADVANTAGES: Cost of Fuel ONE FARTHING per hour per horse power. 50 PER CENT. less than Gas-Engines. Absolute safety. Entirely Automatic. Only attention required being for fire at long intervals.

ANY FUEL CAN BE USED.

Furnishes abundance of hot water for heating or other purposes, without affecting motive power.

IS PRACTICALLY NOISELESS, NO SMELL, SMOKE, OR NUISANCE

PRICE: Half-H.P., £54. 1-H.P., £73. 2-H.P., £105.

AND OTHER SIZES IN PROPORTION.

LONDON OFFICE: FOUNDERS' HALL, 13, ST. SWITHIN'S LANE, LONDON, E.C.

London: Printed by WALTER KING (at the office of King, Sell, and Railton, Ltd., 12, Gough Square); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, June 25, 1889.

THE GAS INSTITUTE.

PROCEEDINGS AT THE TWENTY-SIXTH ANNUAL GENERAL MEETING,

HELD ON

TUESDAY, WEDNESDAY, and THURSDAY, the 18th, 19th, and 20th of JUNE, 1889,

AT THE

INSTITUTION OF CIVIL ENGINEERS, 25, GREAT GEORGE STREET, WESTMINSTER.

REVIEW OF PROCEEDINGS.

There was an unusual stir of expectation, as was only natural, among the members of The Gas Institute and their visitors who gathered on Tuesday morning at the Institution of Civil Engineers to attend what was generally regarded as a critical meeting. The hour of assembly was later than usual; and some time before the clock struck eleven a steady stream of men from all parts of the kingdom was setting in through the portico of the well-known building in Great George Street, and the benches of the lecture theatre were fairly filled before Mr. G. Garnett, M. Inst. C.E., the Acting President, *pro tem.*, accompanied by the other members of Council, and their legal adviser, Mr. Radcliffe, put in an appearance. Mr. Garnett was well received; and the motion, necessitated by the peculiar circumstances of the case, that he should take the chair, was carried by acclamation. It was thus perceivable, from the commencement of the proceedings, that Mr. Garnett and his associates in the recent administration of the affairs of the Institute had in the hall a large body of sympathizers, whose support carried them, as the event showed, successfully through the day. Mr. Garnett began his reign over the meeting by pronouncing a carefully-prepared, well-ordered, albeit somewhat argumentative exordium to the members; bespeaking their condonation of all that the Council had done in the past, and their favour for the official programme of the day. The first routine business was the presentation of the minutes of the last annual meeting; and the existence of unusual circumstances was immediately revealed by the insistance of the meeting upon the reading of this formal record, instead of its being taken as read, according to the usual practice. This statement furnished Mr. C. E. Jones with an opportunity for asking whether any official record would be made of the extraordinary events following the last meeting. The inquiry served to introduce Mr. Radcliffe to the meeting; this gentleman being then, as very frequently afterwards, when points of procedure were in question, requested by the President to make a direct reply. Here it may be said that much of the smoothness with which the contentious business of the day was transacted was undoubtedly due to the calmness and address of Mr. Radcliffe; and a spectator of the proceedings who remembered last year's muddle could not but feel sorry that the then President and Council had not the advantage of the same advice and assistance. Mr Longworth officiated as Secretary, being assisted by Mr. Tilley. Volunteer scrutineers of the ballotting-papers were then called for; and the successful progress so far of the formal business evidently put the meeting more at ease, for the report of the Council and the accounts for the past year, having been already published and circulated, were taken as read and adopted. This showed clearly enough that the Council had not to fear opposition upon their preamble; and the President proceeded with evident relief to read his Inaugural Address, which appears in another column.

The first portion of the address was a defence of the action of the Council in carrying on the Institute; followed by an unnecessarily pessimistic review of the position of the gas industry. Then came a few remarks about the educational work that the Institute might do, but does not; and these were followed by some not particularly weighty observations upon the commercial probity of gas managers. After this came an elaborate, and, as many may think, an altogether uncalled-for justification of those gas managers who happen to be inventors of gas apparatus or investors in manufacturing companies, against imputations that have been made against them on this account. We do not, however, remember that any blame has ever been ascribed to these necessarily clever and provident gentlemen, from a quarter worthy of the smallest notice. Much that the President said upon the subject is undoubtedly sensible and to the point; but the matter is best regarded as a particular development of the general idea of joint-stock trading which is one of the most striking features of the modern commercial system. With the principle of limited liability is naturally associated the idea of limited interest. It is but reasonable to assume, as a working hypothesis, that the interest of an investor in the concern to which a limited portion of his means is confided will be similarly restricted; and that as the success or failure of his monetary speculation need not necessarily affect his solvency, so he need not lose his moral balance on the same account. The most noticeable incident arising out of the reading of the address was the hearty reception accorded by the meeting to the mention of Mr. George Livesey's name, which was made by the President in the course of his brief remarks upon current gas engineering projects. The concluding portion of the address was very well conceived, having regard to the circumstances of the occasion. In insisting upon the responsibility of all members of the Institute, past and present, for its condition now, Mr. Garnett plainly, if informally, proffered an invitation to all to take part in the work of improving it. He insisted upon the remediability of the troubles of the Institute; arguing that no mistaken steps taken in the past are irretrievable, and pleading for amity in the ranks of the profession. Whatever may be the results of this attitude on the part of Mr. Garnett, it is right to record here that his meaning was perfectly caught by his hearers, and heartily appreciated by the great majority. The applause that followed the conclusion of the address was prolonged, and seemed to unite more of the members than had previously joined in one mind respecting the conduct of the meeting.

The customary vote of thanks to the President for his address having been moved, seconded, and given with renewed demonstrations of approbation, there came an incident which, as it turned out, was the only disagreeable *contretemps* for the Council and President for the whole three days' proceedings. This was the projected award of the Birmingham Medal, which was persisted in, notwithstanding remonstrances and advice to the contrary from friends of the Council and others who could scarcely be so classified. It was nothing else than a spirit of sheer obstinacy, or it might perhaps be called defiance, that inspired the Council to go forward with their proposed award of the medal, regardless of the susceptibilities of any gentleman who might be selected as its recipient. The event justified the counsels that had been tendered to the Council, to let the matter stand over until the bestowal could carry with it the weight of an agreement of a full governing body. Mr. Newbigging, of Manchester, was named by the President as having been chosen as the medallist for the year; but in the same breath he was obliged to confess that Mr. Newbigging had declined the gift. It is rather to be regretted that this undoubtedly delicate task was performed by Mr. Newbigging in a way that

for the moment seemed calculated to offend both parties to the controversy that has arisen over the proposed award. It would not be gracious to dwell unduly, however, upon this additional bit of unpleasantness of a situation that for many months has been full of heart-burnings, reproaches, and—mistakes. It is our duty, as faithful chroniclers of history for the reading of those who have not, as well as those who have, been concerned in the making of it, to record the incidents of the recent meeting, and the impressions they created at the time; but, having done so, we have no wish to embitter the memory of these things. It is unnecessary for us to avow the estimation in which we, in common with all engaged in the gas industry in Great Britain, hold Mr. Newbigging. If unswerving rectitude of character and unflagging industry in his profession render a man worthy of regard, then is Mr. Newbigging to be regarded as a bright example of these signal virtues. It is no secret that it was the intention of the Council last year, had circumstances permitted, to have awarded the Birmingham Medal to Mr. Newbigging; and it is most regrettable that the precipitancy of the Council who have just been relieved from responsibility should have introduced a disturbing element into the course of events that would inevitably, if he had lived so long, made Mr. Newbigging the recipient of this distinction in due course. We have always scrupulously avoided making any recommendation of names for this prize of the profession. Our columns will be searched in vain for any editorial hint of this nature, for we have always felt that the Council should be left unfettered in the exercise of their discretion with regard to so delicate a matter; and we would do no man such a disservice as to bandy his name in connection with the medal, when the Council for the time being might have their own proper reasons for choosing otherwise. In the present circumstances, however, we have no hesitation in remarking that if the medal is kept in safety *in its present state* for another year, it will not be any the worse.

The incident of the Birmingham Medal brought Mr. C. E. Jones up again; but he did not sensibly delay the proceedings, and was even of service to the Council by getting the laugh which he so dearly loves, and under cover of which the President called upon Mr. W. A. Valon, who advanced to the table in trepidation, as though he feared to be "carpeted" in some fashion connected with the last incident. It transpired, however, that he was only wanted for the satisfactory business of receiving the President's Medal and the first premium for his paper last year; this being, we believe, the third time that Mr. Valon has earned this gratifying distinction. Mr. J. Somerville was then presented with the second premium, and Mr. W. J. Dibdin named as the recipient of the third; but, not being present, the award was in his case postponed. In transacting this complimentary business, Mr. Garnett fully recovered his spirits. He has done a good deal himself in the way of testimonial giving and receiving, and is in his element upon such occasions. Then followed the adjournment for luncheon; everybody present feeling glad, and rather astonished, that the morning's work had been gone through so easily.

When the members reassembled, it was to find that the Scrutineers—Messrs. Wimhurst and Sapey—had done their duty, and the list of officers for the ensuing year, prepared by the Council, was declared to be carried. The names of the gentlemen selected will be found in another place; and it only need be said here that the general opinion of the meeting appeared to be that the list contains some eminently satisfactory names, and likewise some particularly weak ones. But it is not for us to go into particulars in this regard, which most of the readers of these lines who happen to know the gentlemen in question are quite able to determine for themselves. The ordinary executive of the Institute being appointed for another year—and it should in justice be stated that the election of Mr. Garnett to the presidency was deservedly a most popular choice—the meeting was made extraordinary for the purpose of electing three new Trustees in the places of Messrs. Newbigging, Livesey, and Foulis. Mr. D. Clarke, of Ashton-under-Lyne, proposed for the office Mr. Thomas Newbigging—who, it appears, did not formally resign his trust when he gave up the Institute in company with the majority of the old Council last year—Mr. P. Simpson, and Mr. G. Garnett. The names of the gentlemen who had been chosen by the Council for recommendation for this office (which, by the way, under the new rules subsequently enacted, does not carry with it a seat on the Council) had been kept quite in the dark; but the selection was eminently popular.

Then came the kernel of the business part of the Council's programme—the mooting of their great scheme of relegation for members engaged in trade, which involved the abolition of the whole class of extra-ordinary members, and the degradation of all members who, in the opinion of the Council, had ceased to possess a strict qualification under a more rigid rule. Thereupon Mr. C. E. Jones once more "took the floor," and, either artlessly or skilfully, involved the Council and the meeting in a muddled discussion at once of the whole scheme of the new rules and of the relegation scheme. In the course of his speech, Mr. Jones assumed almost unique responsibility for the old rules (which was rather hardy of him, seeing the hopeless way in which this wonderful code broke down last year, when the first real strain was put upon it after it had proved powerless to prevent the turning of the meetings of the Institute into bear-gardens year after year), and proposed the postponement of the relegation scheme for twelve months. This suggestion was seconded by Mr. S. R. Ogden, of Blackburn, who naively let it be seen that he did so with the hope that the result would be the same as follows in the House of Commons when a Bill is ordered "to be read a second time that day six months." The idea evidently suited the temper of the meeting; and accordingly Mr. T. Duxbury, who was the mouthpiece of the Council in this business, and who was plainly in a mood of sober earnest that jarred with Mr. Jones's airy method, suggested the advisability of their retiring for a few moments to consider the course they should follow. This proceeding was prevented for the time by Mr. D. Bruce Peebles, who, as an extra-ordinary member, stated, in a short but very telling speech, sparkling with the dry "wut" of which he possesses the recipe, his objection to be degraded. Mr. George Anderson, who kindly took the Council "under his distinguished patronage" for the whole of the meeting, supported the proposal. This brought up Mr. Duxbury again, who forcibly stated the points of weakness in the old rules, and showed where they needed amendment. Mr. Jones rose once more in reply; and for the time things looked cloudy. But he had no real following; and the Council gained their point—solemnly filing out to consider what was by this time a foregone conclusion. When they returned, it was to announce that they would agree to postpone the question of the relegation of the "trading members;" but this failed to satisfy Mr. Jones, who wanted all their proposals *in re* rules to be deferred. Mr. Peebles pressed for a declaration from the chair respecting the legality of the process of relegation; but he failed to obtain satisfaction—the President evidently thinking that a point so expressly reserved for future treatment might be left as it stood.

Mr. Duxbury then urged the necessity of an amendment of the rules, with more special reference to Rules 24, 25, and 49; putting the case with great clearness and force. Until this emergency, Mr. Duxbury had been an "unknown quantity" in the Institute. But he now displayed the metal of which he is made; and it is only to be regretted that the Council did not authorize him to press for the consideration of the whole of the new rules, with the exception, of course, of the reserved point. Then ensued a period of somewhat warm debate, only narrowly preserved from confusion by the President and Mr. Radcliffe, who between them managed to defeat what looked at times very like an attempt to keep the rules in immediate question in their old unworkable state. Ultimately the difficulty was settled, and the rules were put in a condition which, if they had originally been drafted in this form, would in all probability have saved the Institute from last year's *fiasco*.

The President then became jovial, and business went on swimmingly. Rule 8 in the new programme was adopted; and the meeting agreed to sufficient other rules to transform the constitution of the governing body. Hereupon a last effort was made, on the initiation of Mr. C. S. Ellery, of Bath, to get the whole of the business of rule-making finished in the one sitting; thus leaving the Institute free for the future for the transaction of its ordinary affairs. But this was not successful; and the meeting (the attendance at which had been maintained very fairly throughout) adjourned for the day—the President declaring, before quitting the chair, that all the extra-ordinary business was concluded. Thus ended, amid general congratulations, one of the most portentous days in the history of The Gas Institute; leaving the honours with the President, Mr. Radcliffe, and Mr. Duxbury, for difficult work admirably performed.

Wednesday began promisingly with Mr. Valon's paper on the use of oxygen in gas purification, which continued the

story begun by the same author last year, and carried on by communications in our pages and by statements made to the Southern District Association on the occasion of their recent visit. The reading and discussion of this paper was, in reality, the only good bit of technical work transacted at the meeting; the other papers, contributed by Mr. G. Anderson and Mr. N. H. Humphrys, being altogether indifferent. The Council were doubtless indebted to these gentlemen for coming forward to save them from an absolutely vacant space in the programme where the list of papers ought to be; but for all that they advanced the questions with which they professed to deal, the programme might as well have been left vacuous. It is with no wish or desire to hurt the feelings of either Mr. Anderson or Mr. Humphrys that we insist on the maintenance of a standard for Gas Institute papers superior, if possible, or at any rate not inferior, to that observed by the various District Associations of the country. For the credit of British gas engineers, it is to be hoped that foreign critics will bear in mind the circumstances of the case, and not gauge the *technique* of the country by what was done to fill up time at the recent Gas Institute meeting.

The speed with which the business of the meeting had been got through enabled the Council to meet the wishes of the members for some sort of outdoor trip; and accordingly, to the general satisfaction, Mr. Garnett announced on Wednesday that the next afternoon would be devoted to a steam-boat run down the river to the East Greenwich works of the South Metropolitan Gas Company. In making this statement, the President alluded to the existence, on the part of himself and the members generally, of a desire for reunion with Mr. George Livesey and the group of seceders with whom he is identified; and the sentiment was warmly applauded. A proposal to hold the next year's meeting in Ryde, as a well-deserved compliment to the President, was received by the meeting with acclamation, on the proposal of Mr. Hepworth, and agreed to without a dissentient voice.

The remainder of the business calls for but little notice. In moving a vote of thanks to the Council, by name, for bringing the Institute so far on its way as the holding of the present year's meeting, Mr. Hepworth made one of the most pleasant and altogether worthy speeches that have ever been pronounced in these gatherings. He decorated the hall with olive-branches, so to speak; making an appeal for reconciliation on all hands that went straight to the hearts of his hearers. He was supported by Mr. T. O. Paterson and Mr. C. E. Jones; and the sentiments he had expressed were most enthusiastically adopted by the meeting. The routine award of complimentary votes was marked by another humorous speech from Mr. D. Bruce Peebles, who actually succeeded in saying something new and funny about the well-worn metaphor in which the Institute is compared to a ship navigating troubled waters. In thanking Mr. W. Longworth for his services in the capacity of Honorary Secretary, the duties of which position must have been very arduous, it was proposed by the Council to acknowledge them by the bestowal upon Mr. Longworth of an *honorarium* of 50 guineas. The meeting, however, was disposed to be more generous, and doubled the amount of the gift, which was certainly the most practical way of showing the members' appreciation of Mr. Longworth's pains on their behalf. Whatever may be thought about the wisdom of the policy which he has been the instrument in carrying out, it cannot be denied that Mr. Longworth has had a great deal of work thrown upon his hands during the past six months; and the members who have approved of that policy could not do less than signify in this fashion their sense of obligation to their Honorary Secretary.

The meeting ended, for the majority of the members, with the hastily arranged trip to East Greenwich already mentioned. It was only on Tuesday evening that Mr. Longworth telegraphed to Mr. Livesey asking permission to visit the works; and although consent was readily accorded, there was scant time for the settlement of details. A special steamboat was provided; and so popular was the visit that, whereas Mr. Longworth had warned Mr. Livesey to expect 120, nearly twice this number put in an appearance—causing a little crowding of the steamer, and a severe run later upon the refreshments provided for the party on the works. It is unnecessary for us to describe the East Greenwich station after the full particulars of it that have been given in the JOURNAL from time to time. The day was gloriously fine; everyone was in a good humour; and nobody would have guessed, from the appearance of the party or of their hosts, that there had been anything like a division between them. Mr. George Livesey, Mr. Frank Livesey (Chief Engineer), and other officials of the South Metropolitan Company received the visitors and conducted them round the works; the solidity of construction and severe simplicity of planning everywhere manifested in this station receiving much comment. Refreshments were provided in the 'tween decks of the jetty; and an opportunity was afterwards presented for showing Mr. Livesey that his personal popularity among the members of the Institute is undimmed by what has for a time separated him from the organization. No one who was present on this occasion can doubt that, whether in or out of the Institute, Mr. Livesey is irremoveable from the pre-eminence which he has long enjoyed in the esteem of the members of his own profession. Mr. Frank Livesey also received an ovation. The party returned to London delighted with their short excursion, and the meeting of The Gas Institute for 1889 was over.

A party of about 120 members and friends took tickets for the trip to Paris; but neither the President nor any of the Vice-Presidents could join in this supplement to the regular proceedings. It was understood that only one day —yesterday—was to be devoted to the formal meeting with the French gas managers; the remainder of the time occupied by the excursion being left entirely free for independent sight-seeing.

REPORT OF PROCEEDINGS.

The Twenty-sixth Annual Meeting of the members of The Gas Institute was held on Tuesday, Wednesday, and Thursday last week, at the Institution of Civil Engineers, Great George Street, Westminster, S.W., under the presidency of Mr. GEORGE GARNETT, M. Inst. C.E., who was unanimously voted to the chair on the motion of Mr. HARRISON VEEVERS, of Dukinfield, seconded by Mr. DAVID CLARKE, of Ashton-under-Lyne.

The PRESIDENT, in opening the proceedings, said that, on his own behalf and that of the Council, he was very glad to be there. He was not going into anything except business on this occasion; but he desired, on the part of the Council, to thank the members for the sympathy and good feeling they had exhibited towards them during the last eight or nine months. They were there that day to render an account of their stewardship; and he trusted that before the meeting was over they would hear the grand plaudit, "Well done." At any rate, they had endeavoured to deserve it.

The notice convening the meeting having been read,

The PRESIDENT asked whether the minutes of the last meeting should be read, or be taken as read, as had been usual.

A MEMBER having suggested that the minutes should be read, and no one objecting,

The HONORARY SECRETARY (Mr. W. Longworth, of Guildford) read the minutes.

Mr. C. E. JONES (Chesterfield) said he should like to ask, before moving the confirmation of the minutes, whether the unfortunate events which had happened since the last meeting had been recorded, and how. They were now making history; and it would be well to have these events placed on record in such a manner that those who came afterwards would be able to judge intelligently of the action which had been taken from time to time by the minority of the Council of the Institute.

The PRESIDENT asked to be allowed to introduce to the meeting Mr. Radcliffe, Solicitor to the Institution of Civil Engineers, whom they had requested to attend, and assist by legal advice when necessary. He would ask him to answer the question put by Mr. Jones.

Mr. RADCLIFFE said the only question before the meeting was whether the minutes faithfully recorded what took place at the last meeting. The meeting could not go into what had occurred subsequently; and if the members thought that the minutes were correctly recorded, they ought to confirm them.

Mr. JONES inquired if it was not open to the meeting to expunge any portion of the minutes.

Mr. RADCLIFFE said it was not.

Mr. JONES said in that case he would move that the minutes be confirmed.

Mr. THOMAS seconded the motion, which was carried unanimously.

APPOINTMENT OF SCRUTINEERS.

On the motion of the PRESIDENT, seconded by Mr. JONES,

Messrs. Wimhurst and Sapey were appointed Scrutineers of the voting-papers.

Report and Financial Statement.

The report of the Council (given in the Journal for the 4th inst.) and the statement of accounts were then taken as read, and unanimously adopted, on the motion of the President, seconded by Mr. W. Syms (Rochester).

The Presidential Address.

The President, having asked to be allowed to remain seated while reading (having recently met with an accident), then delivered the following

INAUGURAL ADDRESS.

Gentlemen,—In addressing you from the presidential chair, I feel that something like an explanation is due from myself, as one that has accepted the office of President, not by choice of members in the usual course, but at the unanimous request of his colleagues on the Council.

You are well acquainted with the unenviable position in which we have been placed, and the unusual difficulties with which we have had to contend during the greater portion of the official year that closes at this meeting. If, in our desire to meet these difficulties, we may have taken steps with which you cannot entirely agree, I think that we may fairly urge, in extenuation, the unprecedented state of affairs, and also the determination to discharge, to the best of our ability, the trust which you committed to our care in selecting us as your representatives on the Council. At any rate, we may ask you to credit us with a share of that feeling which undoubtedly animates every member who is here to-day—a wish to maintain our Institute, which many of us have laboured to establish and support, not only as The Gas Institute, but also under its old title of the British Association of Gas Managers. Probably there are not many present who remember its early days—the slow progress that it made in general favour amongst the profession, and how many well-known engineers held themselves aloof until it was fairly established and forced itself upon their notice as a going concern. If they have any lively recollection of its infancy, they cannot but be astonished at the impetuous style of those who have been busy during the last few months trying to force upon us the dissolution of this Institute, with the ostensible view of building a better one upon its ruins.

When The Gas Institute has really proved a failure, when the purposes in view at the time of its establishment cannot be carried out, when the members are so entangled in technicalities as to be unable to exercise their free will and judgment in regard to its affairs, when the meetings are badly supported or ill attended—then, and not till then, will be the time to talk about dissolution.

Let me put it before you as no light thing, but as a very serious matter in regard to the welfare of our industry. It is a serious matter, if our Institute is worth anything at all to us. The breaking up of chains that have bound us together for more than a quarter of a century, and the forging of fresh ones, cannot be done in a day or a year. There are many helpful working members now throwing in their whole energy as permanent workers in The Gas Institute, but who would feel chilled and blighted by its dissolution. As in the formation of the British Association of Gas Managers, so it would be in regard to the new Association. Many would join the ranks of that large number who would prefer the cautious course of standing aside for a few years as passive watchers, either to see if it would be a success, or if it would fit in with certain individual fads or prejudices, before adding their names to the list of members. Perhaps a small roll of names might be obtained in favour of the policy of knocking down the old edifice, endeavouring to eliminate certain objectionable elements from the old materials, and bringing in new ones that would, in the opinion of those who introduce them, strengthen and render the new structure more acceptable, useful, and free from so-called defects, whilst combining all the advantages of the old one. But I venture to say that the majority of those who support such a scheme, as a matter of fact, would prefer a waiting policy, and that the bulk of the work would have to be done by a comparatively small executive, who would have to cope with, and be greatly hindered by, all sorts of objections and conflicting opinions.

It has been set before you as a simple matter to form a new Association, the benefits of which would be immediately available. But I would ask you to consider if it is reasonable to suppose that a new Association, embracing the number of members now enrolled upon the books of The Gas Institute, could be got into working order in a year? Assuming such to be formed, is it reasonable to suppose that the meetings for the first, second, and even for the third year, would attain to such proportions, in regard to attendance and to order of business, as those of our last few meetings?

The times are not so favourable in regard to our industry that a pause of a few years, whilst we reconstruct our Institute, would be a trivial matter. If there were no immediate call for special effort, if everything were smooth and easy sailing—the demand for gas increasing, no likelihood of competition—then we might well say that a convenient opportunity had arrived to introduce reforms, assuming that they are required. But what are the plain facts? Is this a time when those who represent the gas interests, and have property under their charge which, according to the latest parliamentary returns, is represented by the enormous sum of £60,000,000 or £70,000,000 sterling of invested capital, can afford to spend their time on the discussion of questions of detail, upon which it is impossible that conclusions satisfactory to everybody can ever be attained? I think not. The electric light is now established in London on a large working scale; paraffin and petroleum are improved in quality and cheapened in price; and newly-invented forms of lamps, presenting a great advance on the old ones, are being daily introduced and energetically pushed in most of our districts. The cost of a few lamps represents only a small outlay—trifling in comparison with that required for gas-fittings; and we must remember that many of the tradesmen who sell the lamps have a direct interest in the disposal of them, that does not apply in the case of gas-fittings. The only benefit to them on the sale of a gaselier or other gas appliance is the trade discount. It is a matter of perfect indifference to them whether the demand for gas is benefited or otherwise by the transaction. But it is different as regards the oil-lamp. In almost every instance the tradesmen are also retailers of oil, and therefore can even afford to sell the lamp at cost price, and look to the regular consumption of oil for their profit. The gas-fittings are sold, and there is an end to the matter so far as they are concerned; but the delivery of an oil-lamp is, to some extent, the opening up of a regular account. Nor is the lighting department the only direction in which we are threatened with competition. We have been able during the last few years to congratulate ourselves on the increased demand that has arisen for gas for other than lighting purposes, to be consumed through the medium of heating-stoves, cooking-stoves, and gas-engines. But energetic endeavours are now being made to take from us a share of these lines of business. Not only are there petroleum-stoves and petroleum-engines in the field—offering the same inducements to vendors of oil that obtain in the case of lamps—but all the past history of water gas has been overhauled, in the hope of overcoming those difficulties that led to the failure of numerous schemes for its application in the past, and of hitting upon some practical process for meeting the popular demand for a cheap fuel gas.

These are plain facts. It would ill become me to address you in an alarmist spirit on the one hand, or to lull you into a Fool's Paradise on the other. We have no right to expect freedom from competition, nor would such, if attainable, be an unmixed benefit to gas engineers. It may be questioned whether gas shareholders have not enjoyed beds of too soft a nature in this respect in the past, and whether the gas industry of to-day would not be in a more wholesome and substantial position had a little more competition been experienced. From a gas engineer's point of view, I welcome a moderate amount of honourable competition, as likely to place us on better terms with our employers, and as affording opportunities for the exercise of our skill and ability that would not otherwise arise. I welcome it especially on behalf of the younger members of this Institute—who have hitherto not had much to do beyond following in the paths that were made smooth for them by their predecessors—as it will give them room to show of what stuff they are made; and as likely to increase the appreciation, on the part of directors and shareholders, of the services of really good and competent men. When everything is *couleur de rose*—full dividends, no dissatisfaction as to the price or quality of gas, and business increasing year by year without effort—the directors are rather apt to lose sight of the fact that their manager should be a clever engineer and scientist, able to seize hold of every modern improvement and turn it to practical account. They come to regard him more in the light of a steady-going mill

horse, who has nothing to do but to plod steadily round and round the well-beaten track. Provided that they find, on the occasion of their meetings, satisfactory evidence of the fact that he is well in harness, and jogging at the proper pace, they go away fully satisfied. Had there been more competition, there would have been no necessity for my predecessors in this chair to declaim, as they have most properly done, against the absurdly small salaries that have, in some instances, been offered to gas engineers. So far as one may judge from the tone of recent advertisements, a more appropriate value is now put upon the services of gas engineers. With more competition there will come, on the part of directors of gas undertakings, a greater sensibility as to the need for economical and skilful working in every department. Good business and administrative capabilities will by no means be less necessary in the future than they have been in the past; but gas managers will require, in addition, a wider range of knowledge, both as regards chemistry and physical science generally and that range of subjects that are included in the somewhat indefinite term "engineering."

One need only refer to the number of new processes that are continually being introduced, both in regard to the manufacture, purification, and combustion of gas, as a proof that we should have an intimate acquaintance with the composition and properties, not only of coal, but also of all other gas-producing materials, and with the distinctive features of the kinds of gas evolved from them. Even as yet our knowledge on the subject of the various compounds that contribute the illuminating property to our gas is somewhat empirical, and consequently imperfect. As to the use of materials for constructive purposes, it is indispensable that we should thoroughly understand the structural capabilities of steel, wrought iron, and concrete, not to mention many other modern developments.

Each member will do well to ask himself: Am I up to modern requirements? Especially does this apply to young engineers, who enjoy facilities for rendering themselves fully competent that did not fall to the lot of their fathers. If a young man has means, and can devote five or six years to the object of acquiring a good professional training, so much the better; but in these days no one who is determined to succeed need feel discouraged, even if he is compelled by force of circumstances to earn his living day by day at the bench or the forge. Look at our cheap technical literature, our science classes, our lectures, our colleges. I would even go further than that, and point out to our humble friend in fustian, who thinks he has no opportunities, that if he is unfortunate in one respect he is favoured in another. Are we not recognizing the fact that a course of technical education is not complete without a term of actual daily labour in the workshops? If a young man chooses to use his wits and lay himself open for instruction—not sitting idly waiting for knowledge to come to him, but searching diligently for it—then the workshop will prove a good school for him, and he receives payment for attending there, which is not the case with other schools. The wisest man in the world has reminded us that "wisdom lurketh in secret places," and that we must "watch at her gates and wait at the posts of her doors." The student who wishes to advance in any profession must remember these facts. Do we not every day see instances of the fact that folly lies on the surface, ready to every man's hand, but that wisdom must be delved for, sometimes at great depths? Whatever the position or opportunities, the necessity for diligent application is the same.

The position of The Gas Institute as an educational engine has occupied your attention at previous meetings in one form or another. The question should not be allowed to drop out of sight, but ought to be continually before us. I do not propose to occupy your time with a review or a discussion of the various schemes—such as the possibility of promoting classes or lectures in connection with the Institute, or of forming a Board of Examiners—which have already been under your consideration, or to lay down any guiding lines for future dealing with this important subject; but merely to note, in passing, that if we are to act fully up to the avowed objects of this Institute, then the subject of the education of our younger members, or of the sons of our members, must always be in view. Let us look round and see what other technical societies (I will not particularize any by name) are doing. What advantages are they offering to their members? If The Gas Institute cannot do as much, a satisfactory explanation should be forthcoming. But in these, as in other matters, it is well to remember the sound old maxim, "*Festina lente*." Let us make each step good and sure before we take the next. Let us drop mere differences of opinion on questions of detail, which can never be cut to a pattern that will suit all alike, and be satisfied to work hand in hand for the common good.

In the present cry for technical education, there is some danger of losing sight of personality. It would be possible to cite many examples of eminent men who have pushed forward from comparatively humble positions into the foremost ranks of science, commerce, literature, and art; and in every instance the personality, or the individual cast of character, furnishes the chief outlines for the sketch. The learning is there, but often in such a subordinate position as to be nearly out of sight. So let me urge all those who wish to be useful and famous in their day and generation to take a higher aim than that of mere copyists. It is a good thing to be able to grind out the right thing at the right time, just as a phonograph will reproduce faithfully the words uttered into it; but we must rise beyond that.

The tendency of modern days is to regard the human organization too much in the light of a machine. It is to receive a certain amount of mental training; a certain amount of muscular exercise; to avoid all sorts of errors in respect to eating, drinking, wearing apparel, and ventilation—all of which are very well in their way. These are not, however, the only aim of life, but are merely details in our journey towards higher and better things. A pure physical atmosphere is not the only thing necessary for the healthy development of our faculties; we also need wholesome mental, moral, and physical environments. The effect of placing too much dependence upon the mental, to the exclusion of the other orders, has been strikingly exemplified by certain so-called scandals that have lately been brought to light. No doubt there are unfaithful men in all classes of society; but I cannot believe the reckless assertion that anything in the way of dishonesty is so common in our ranks as to be called a "custom." Certain deductions have been drawn from ascertained facts, and extended into the form of a stigma on the whole profession—a stigma that is as undeserved as it is unwarrantable. We have all heard of the schoolmaster who, when he was unable to detect the perpetrator of a grave fault, meted out corporal punishment all round to every boy in turn; but this principle has never yet been accepted as just and right. Gas engineers as a body, have been the subject of unjust accusations; but let us do as others have done under similar circumstances—live them down. Let us, one and all, illustrate by our daily conduct the recklessness, not to say falsehood, of our traducers.

This leads up to a somewhat delicate subject, which I approach with greater confidence on account of a firm conviction that it should not be shirked, but thoroughly discussed and thrashed out. I allude to the position of the so-called "trading element" in connection with our Association. There has been a great deal of loose talking and writing on this subject, which has had the usual effect of raising such a cloud of dust as to obscure the real facts of the case. In the first place, what is the "trading element?" It has been confused in the minds of some gentlemen with what, for the sake of distinction, may be called the "touting" element." But a constructor of gas apparatus may be as desirous of joining the Institute as a manager of a gas-works, and from motives not less disinterested. Those who condemn a trader for joining the Institute in the hope of being able to improve his business thereby, should remember that gas managers use it for very much the same purpose. Why do gas managers take so much trouble to acquaint themselves with all the details of their business, and with new inventions, &c., if the ultimate result is not to be some improvement in position and salary to themselves? Going further, it is quite possible that the traveller or agent, whose only direct interest in the gas industry is a commission on the sale of certain appliances, may take sufficient interest in our proceedings to be a patient and attentive auditor at our meetings. Provided he comes here for the *bonâ fide* purpose of listening to our proceedings—for which purpose, by the way, all such things as business cards and price lists are superfluous, and may be left at home—I see no reason for denying to him the right of being associated with this Institute. But when it comes to anything that interferes with the progress or convenience of our meetings—when some of our members, instead of taking their proper share in our proceedings, are blocking the entrance to our place of meeting discussing questions of buying and selling, and distracting the attention of those who desire to listen to the various speakers—when anything is done that is derogatory,

either to the proceedings proper or to the dignity of the Institute as a body—then it is time, not only to talk about, but also to make, amendments if the soundness and prosperity of the Institute are to be maintained. But it is idle to blame this sort of thing to the presence of the trading element. The remedy is in your own hands. Once let it be understood that the members come here for the sole purpose of transacting the Institute's business, and not only understood but acted up to, and this sort of thing will soon cease.

And here let me take the opportunity to ask you to accord to those gentlemen who have gone to the trouble and expense of preparing papers, together with diagrams, models, &c., the compliment of your presence and interest. It is most discouraging to read a paper to empty benches. On many occasions at previous meetings there has been a full attendance at the reading of one or two papers only, and then a general stampede of about two-thirds of the audience. Such a proceeding is showing an indignity to the reader of the paper; and, more than that, it cannot assist your Executive in obtaining contributions for future meetings. Such, however, I feel will not be the case at this meeting, for men like Anderson, Valon, and Humphrys must command attention.

Returning to the trading question, allow me to point out the unreasonableness of the supposition that anything in the way of a clear line of separation can be drawn between the gas manager and the trader. Any attempt to draw such a line as has been attempted is not desirable in the interests of progress. The occupations and interests of manager of gas-works, lessee of gas-works, patentee of gas apparatus, consulting gas engineer, contractor for the supply and erection of gas plant, manufacturers or agents for the sale of gas-works plant and appliances, are so interwoven one with the other that it is sometimes almost impossible to lay down any rule that will define who is, or who is not, a *bonâ fide* gas manager. Of course, if the directors of a gas undertaking, for reasons known to themselves, desire to have the strictly exclusive services of a competent man who is willing to enter into a guarantee not to take out patents or invest money in limited liability companies, they would probably be able to secure such a man by the offer of a fair and reasonable salary. But I regard any general notion to the effect that the gas-works manager and the trader should be distinct and separate as simply quixotic.

Look at the manager of a small gas undertaking, with a correspondingly small salary, and probably a large family —large families and small salaries seem to have an unfortunate knack of clubbing together. He has spare time for his hands and brain; and if he has the right sort of grit in his constitution, he will turn his talents to account for the benefit of those dependent upon him. His thoughts turn naturally in the rut of his daily avocations; and, it may be, after a considerable amount of thought, study, and, probably, expense, he elaborates an invention of some utility in connection with our industry. Are we to expect him to make a free present of that invention to the world, for the benefit of shareholders and consumers of gas, because there is some remote chance that, under certain circumstances, he may favour his own bantling, to the exclusion of others? Is he to be debarred from all right and privilege in his invention? If so, the result will be to blight invention and progress in our industry. Again, our energetic friend bestows his abilities in other directions, where the "nimble ninepence" may be earned without the risk of being exposed in the papers as an unprincipled person guilty of underhand practices. What course is best for his employers? As a general rule, common-sense determines the answer to this question; and directors encourage their manager to research and study in connection with his business, knowing that a sure benefit will result to themselves. More than that, they are inclined to be proud of their inventive manager. In this they act wisely, for it cannot be denied that the energy and research which lead to the improvement of details will also tend towards little economies that are not without their influence on the right side of the balance-sheet of the gas-works. Or, let us look a little higher in the social scale. After having undergone a costly training in the best available school of gas engineering, and having obtained practical experience by serving for some years in a subordinate position at a low salary, the now well-qualified gas engineer and manager seeks for some congenial sphere of labour, where his ability will be turned to good account, and be recognized by the receipt of an adequate salary. Having been fortunate enough to get suited in this respect, he will not expect to spend every farthing of his earnings by the time the next instalment becomes due—like the improvident workman who is clean "stumped out" by Saturday night; but will desire to make some provision against old age, sickness, or other contingencies. What is more natural than that he should follow the rule that is universally acknowledged to be fair and correct in regard to all other kinds of business, and invest his savings in undertakings cognate to the gas industry, which have been known to him for many years, so that he can put absolute faith in them. It is a positive hardship if he is to be limited or cramped in any way as regards the investment of his capital. It is true that the gas share and stock market is open to him, but this field is already overcrowded with financiers, who have run up the market price of many classes of gas property to an artificial value. Why should he be forced to put out his money at (say) 4 per cent. interest, and to refuse safe investments that might yield him 5 or 6 per cent., merely to satisfy a sentimental objection?

Looking back on the march of improvement in connection with our special industry, it will be seen that the manufacturers of gas plant have rendered valuable assistance, which I am pleased at present to have an opportunity of recognizing. But the salaried officers of gas undertakings have also contributed their share in the improvements which have enabled us, in conjunction with other favourable circumstances, to reduce the price of gas to less than one-half the figure at which it stood thirty years ago. The man who personally superintends the working of any apparatus is in the best possible position to observe any weak points that admit of being improved away, or any opening for actual development. By personal superintendence, I mean being daily on the spot, and not that kind of supervision which consists in sitting in an office, perhaps in another part of the town, and receiving reports from subordinates. But we are told that the manager must be perfectly distinct from the trading element; which, in effect, means that if his observations lead him upon a line of thought hitherto untrodden, resulting in some invention that may be productive of great advantage to the gas industry as a whole, he is to be greatly cramped in his perfectly legitimate endeavours to procure the best price in the market for the result of his labours. As already remarked, this is not the way to promote that progress which everyone will admit to be urgently needed.

Now, gentlemen, all the talk about greater purity in the gas profession is, after all, a mere trifling with the external aspect of the matter—a question of external ceremonial—a washing of the outside only of the cup and platter. A man may be perfectly immaculate as regards the trading element, and yet he may be dishonest to the backbone. If we look back at the celebrated cases of want of probity amongst our ranks (in regard to the rarity of which I may compliment the members of the Institute generally), and examine the means by which various direct or indirect acts of deceit have been accomplished, do we find them to be such as might have been prevented by any precautions on the part of the directorate, in the way of securing an officer who has absolutely no interest in any other undertaking whatever? Is it not rather the case that this question is in no way concerned in the matter? If we want to make our industry and profession a bright and shining light to all others in the matter of probity and strict morality—and no one would be more delighted than myself to see it in that proud position, which I believe it is in now—it will be necessary to go very much deeper than can be got by a line of separation between gas-works officials and makers of gas apparatus. Honest men, gentlemen, are honest men, and rogues are rogues, irrespective of the particular investments they may be interested in. I regard the recent expressions of opinion against the wrongfulness of certain acts that might be done, and on the need for greater purity in business transactions, as an outcry against the commercial system of our country as a whole rather than against any special branch of it; as a protest of men of principle and honour against the unblushing perversion of truth which is only colourably different from a direct lie—a perversion common in business circles, and which, when discovered, is hailed with admiration, as a clever thing, rather than treated with the contempt and scorn that it deserves; and as an outcry against chicanery and double-dealing, in putting up prices until the transaction becomes, in plain language, barefaced robbery. Gentlemen, we cannot deny that there is room in all ranks for improvement. Let us one and all do what we can in our day and generation, not only in the way of precept, but also of example, that will work to this end.

But it is time to turn from The Gas Institute and ourselves generally to one or two burning questions of the day in connection with our industry. While the past twelve months have not been characterized by any striking advancement, still you have had plenty of novel proposals upon which to exercise your intellect and judgment. The remarkable results certified to be obtained at Widnes by Mr. Isaac Carr, through the medium of the Dinsmore process of carbonization, the details of which are familiar to you, have naturally excited a keen interest in the further progress of that system. Many of us old stagers, having lively memories of previous endeavours in the way of increasing the yield of gas at the expense of the tar, are somewhat dubious as to the practicability of attempts in this direction. One is tempted here to enter upon some reference to the numerous schemes, supported by some of the best authorities of their day, which have made a promising commencement in their commercial career, but have, one after the other, come to an ignominious end. But this does not render it impossible for a modern inventor, no doubt greatly assisted by the mistakes of those who have preceded him, to make a practical success of that which has been hitherto conspicuous as a failure. I am sure that every member of the Institute will wish Mr. Dinsmore success in producing a larger yield, and especially an improved quality, of gas from coal at the present time, when there are rumours of coal and labour strikes in the air.

Then we have the experiments in connection with the use of pure oxygen for the purification of gas, that have been conducted under the care of Mr. S. R. Ogden, of Blackburn, and our very energetic, albeit conscientious and unassuming member, Mr. W. A Valon, of Ramsgate, which bring the much-desired goal of complete purification in closed vessels almost within reaching distance. As you know well from previous experience, Mr. Valon is always willing to give his fellow-members the benefit of his valuable knowledge ; and I am relieved from the necessity of making any further remarks upon his labour in connection with the manufacture and use of pure oxygen, by the fact that you are to have the privilege of hearing a paper read by him on this subject—a privilege which I am sure all will fully appreciate.

On the question of gasholder guide-framing, and the feasibility of dispensing with the heavy columns, girders, and exterior guide-framing generally, that are now considered indispensable adjuncts to a gasholder, so many different schemes are before us that time does not permit more than this passing notice of them. Mr. G. Livesey, Past-President, who is so well known to all of you as a pioneer in many important directions, has already proved the practicability of working the top lift of a holder without guide-framing. With this achievement before us as a matter of actual fact, we may confidently expect that the practical experiments, now in progress at Northwich by Mr. Thomas Newbigging, Past-President, with Mr. Gadd's new and ingenious plan, will eventually lead to some important economy in gasholder construction. Mr. E. L. Pease, of Messrs. Ashmore, Benson, Pease, and Co., Limited, has also entered the field with an invention by which he claims to guide gasholders from the base without the aid of columns. The model of this invention is reported to have satisfied practical gas engineers ; but as yet details have not been made public. Should it be possible in future to erect and maintain holders without exterior guides and framework, the cost of supplying gas to the public will, of course, be materially decreased.

Amongst other improvements in the construction of gasholders is that of Messrs. S. Cutler and Sons ; and a practical illustration of its advantages is now in course of erection at Tunbridge Wells, where it was introduced by our grand old friend and pioneer in every useful work, the late Mr. R. P. Spice, Past-President. Messrs. Cutler have discarded what has hitherto been largely the practice in constructing gasholder guide-framing—viz., the erection of more or less massive columns or standards, tied together by a series of horizontal guides, and in some cases further strengthened by diagonal ties, to which more or less importance has been given. Messrs. Cutler, in their patent guide-framing, have constructed what is practically a cylinder of wrought-iron work, consisting of vertical members, forming the guide-paths, and a series of girders crossing each other and fixed to each other at the points of intersection. Each line of each series of girders, therefore, partly encircles the holder, forming in its line a portion of a spiral. The broad surface is placed diagonally to the horizon ; and thus the whole forms a cylindrical network of girders, broad in every direction. I understand that this system of framing has been very favourably reported on by scientific experts ; and there is no doubt that those who have seen the structure, as it now stands at Tunbridge Wells, must have been impressed with its strength and rigidity. It is a description of framing that no doubt calls for the careful consideration of all engineers who may be contemplating the erection of new gasholders of anything like important dimensions.

But the chief question before us at the present time is not so much connected with what is going on inside the walls of our gas-works as with the general procedure in the districts we supply ; it is not so much a matter of manufacture and purification as of our relations to our consumers. The commercial, rather than the technical department now calls loudest for our attention. Hitherto the duty of the gas engineer has been considered to be completely fulfilled when he has delivered an ample supply of gas at the consumer's meter. How the consumer used the gas has been not so much a matter of indifference to the gas engineer as one that the consumer preferred to attend to himself, with the very incompetent aid of the average gas-fitter. The members of this fraternity would promptly bring to book any interfering gas manager in a small town who ventured to think differently from them. He must not sell even a burner without the risk of increasing their displeasure, as a direct poacher upon their preserves. Now, this sort of thing will suit the interests we represent, provided that two conditions are complied with. The first is that the gas-fitter should interest himself in introducing the use of gas as far as he possibly can ; and the second is that there shall be no competition. It is idle to consider these conditions, as no member of this Institute, I fancy, can say that they exist in his experience. Is there a town where the gas-fitting class are sufficiently well informed, skilled in their work, and moderate in their charges, as to warrant the assertion that the interests of the seller of gas are adequately represented ? Is there a place where the gas supply is never blamed when the real fault rests with the improper manner in which it is used ? But the gas-fitter is not wholly at fault in this matter. Much of the trouble is due to the demand for cheap fittings. Indeed, it is not too much to say that a great deal of dissatisfaction and complaint, created by defects in the distributing and consuming plant on the premises of the consumers, is less due to the ignorance of the gas-fitters than to the fact that the consumers will not pay a price sufficient to cover the cost of really good and substantial pipes, appendages, burners, and globes. Go to any gas-fitter in an important way of business, and ask him why his showroom is loaded with the cheapest description of apparatus—three-light gasaliers at 18s. each ; artistic hall-lamps, redolent with lacquer and imitation cathedral glass, at 7s. 6d. ; patent regulator burners, with globes complete, at 15s. a dozen ; and so on. He will probably rummage in some odd corner or other, and will by-and-by bring out from his old stock some really substantial apparatus, together with a few first-class burners of the sort that cannot be made under a cost of several shillings each, although they save their price on the first gas bill. Unfortunately, the consumers will not appreciate any argument to the effect that gas is a delicately-constituted substance, requiring careful manipulation in order to develop its full duty. They rather seem to expect that gas of proper quality should admit of being flared away anyhow, and yet yield a good light, no smoke, and a very moderate bill at the end of the quarter. Such is the popular idea of what coal gas ought to be ; and if the article supplied does not come up to it, abuse is bestowed, with no sparing hand, upon the company as well as everybody connected with it.

We find both oil and electricity coming into the field with the enjoyment of an advantage that is denied to the vendors of gas, and that is a full control of the whole plant up to the point of combustion or utilization. I imagine for a moment how it would fare with these agents if those who sell them were forbidden to do more than supply the electricity or the oil at the premises of the consumer, leaving him at liberty to use the cheapest form of lamp that he could get, or one that for other reasons took his fancy ; and, further, that the consumer attached but little importance to their advice on the matter—being guided, if guided at all, by tradesmen who knew but little of the proper way of burning oil or of utilizing electricity. Such is the position in which these agents should be placed, in order to be fairly handicapped with gas. But as a matter of fact, both oil and electricity are placed before the public with the aid of the best modern lamps and appliances ; and it is very

important that we should consider how best to secure similar advantages for our speciality.

We have already recognized that the usual plan of leaving the sale of gas appliances to ironmongers and plumbers is by no means a satisfactory one in the interests of gas suppliers. It falls very far short of introducing gas to the public in the best possible manner. In some of our large towns, gas-fitting companies have been promoted, under the auspices of the gas shareholders, expressly for the purpose of meeting this objection; and in smaller towns the gas companies lay themselves open for gas-fitting work. To the same origin may be traced the introduction of gas-appliance exhibitions and the practice of letting gas-stoves on hire.

This latter practice is extending, and will probably extend yet further, until it embraces the whole range of gas appliances. The success which invariably attends enterprises of this nature not only illustrates the need for them, but should serve as an encouragement to further progress. Apart from any other consideration, I look upon any plan that enables gas suppliers to take the control right up to the point of combustion as a move in the right direction; and therefore I shall watch with great interest the step about to be taken by our friend Mr. Valon, who seems determined not only to supply a gas of high quality, but also to secure a sale for it. The details of his scheme for supplying fittings entirely free of cost, and looking to a slight increase in the charge for gas for an adequate rental on the same, have been published,* and are well known to you.

Failing the control of all fittings, it would be a great thing if the gas companies could assert their right, in the interests of the commodity they supply, and for which their capital is irretrievably sunk, to have a voice in the matter of the burners only. One way of doing this is by the judicious distribution of burners gratis. By investing a few pounds in burners of a suitable character, and seeing that they are properly fixed, and maintained in good order, at places of public resort—such as post offices, theatres, railway stations, public halls, or places of worship, in the windows of prominent shops, &c.—a good advertisement may be obtained at a moderate cost. Under some circumstances, as where a great deal of trouble has been caused by the use of bad fittings and burners, it may even be advisable to take a whole house in hand, and fit it up from top to bottom as an advertisement. In places where the distance from the works to the central part of the town renders it advisable to have a separate and central set of offices, a good opportunity offers for fitting up a few rooms for gas-burners, gas-fires, &c. All these, however, are merely crude suggestions. The best course must be decided on in each case after consideration of the local circumstances. The point I wish to emphasize is that at present gas is placed at a great disadvantage as compared with its competitors. In directing our attention to the attainment of a fair field and no favour, we are striving for no more than common justice. We do not presume on the so-called monopoly which is such an eyesore in certain quarters. I am sure no member of this Institute would wish to disparage in the slightest degree the ability, energy, and honourable labour that has been directed to the development of electric-light machinery and lamps, or to the purification of oil and petroleum. We simply ask for an equal footing, for fair play, and freedom from prejudicial circumstances that would not be denied to the humblest shopkeeper.

Whilst on this subject, allow me to direct attention to an article, entitled "The Relations of Gas Companies and Consumers," that appeared in the JOURNAL OF GAS LIGHTING on March 19 last. It is worthy the consideration of all who wish to increase the demand for gas, or to improve their position with the public. A careful perusal will reveal the fact that, apart from circumstances beyond our control—such as those just mentioned—there are also many matters of detail, in connection with our dealings with our customers, that serve to create unnecessary friction and distrust, and that admit of easy remedy. It is certainly possible that in some cases gas companies, feeling secure in freedom from competition and a steady increase in the demand for gas, have exhibited a tendency to become somewhat independent in their dealings with their customers. A little candid self-examination on this point will do no harm, and may be productive of great good to all of us.

From our relations to the public to the manner in which the quality of gas is tested is an easy transition; and it will be admitted that the machinery by means of which gas is examined, as a guarantee that the public receive full value for their money, is not altogether in a satisfactory state. It has lately become the fashion amongst the photometrists to turn round upon the legal standard candle as the source of all the troubles and discrepancies that arise in connection with photometrical tests. It may be questioned whether the unfortunate candle is not sometimes made a scapegoat, not only for its own faults, but for all others incidental to our present system of photometry. Experienced gas examiners have repeatedly admitted, however, that in addition to defects caused by the vagaries of the candle, the gas itself is sometimes erratic, and impatient of the very rigid conditions laid down in respect to its combustion.

Now the gas, as we supply it, is not an article of rigid constitution. It is not like a recipe made up according to the "British Pharmacopœia," which can be prepared day after day, and at any properly qualified dispenser's shop in the United Kingdom, of practically constant composition. Coal gas, as ordinarily supplied, does not contain, hour after hour and day after day, a rigid and unvarying percentage of hydrogen, carbonic oxide, ethylene, benzene, and other ingredients; but the exact proportion of each constituent is continually varying. On account of little idiosyncrasies in temperature of distillation, conditions of condensation, &c., they are beyond our control. I hope to see the day when, by means of a long series of searching investigations and careful analyses, light will be thrown on these obstructive points; but, meanwhile, we must accept facts as we find them.

The dimensions of the standard burner are rigidly fixed in every detail, and the length of chimney, pressure, and rate of combustion of gas are also accurately defined; and there is some inconsistency in bringing an article of varying composition under rigid and unvariable conditions of testing. It would be well if a share of the scientific ability and patient research that has for so many years been devoted to the unprofitable work of flogging a dead horse, by proving over and over again the unreliability of the standard candle, could be diverted to this subject. First, we require to know the extent of variation in the constituents of gas supplied from our works from day to day; and having ascertained this, to find out how such variations affect the light afforded by the combustion of the gas in a standard burner. Such investigations might advantageously be extended to the burners in common use.

The position of the standard Argand burner has lately been entirely changed. It was fixed upon as a means of developing the whole of the light obtainable from the gas. The central idea of our Legislature on the subject is that the gas shall be tested by the burner capable of developing the best results from it, with the proviso that it shall not be a mere ingenious laboratory appliance developing an abnormally high result, but a *bonâ fide* burner available for the use of ordinary consumers if they choose to have it. Sugg's "London" Argand was fixed upon as complying with these conditions; and so it did at the time. But this position is now changed. The duty obtainable from modern regenerator and other burners is three times as much as that yielded by the Argand; so the "standard" is now removed from its position at the top of the class, which it held for many years, to a considerable distance down. It is open to us to consider how far this standard is effective as representing the actual value of the gas for general illuminating purposes. Until we are quite sure as to the conditions under which the gas is burned, it seems idle to go into delicate questions of detail involving differences of less than 1 per cent. in the results. Under present circumstances, the variations in the quality of the gas may or may not induce errors of importance equal to, or greater than, those of the standard candle.

When a series of accurate photometrical experiments are required to be made, it is always found necessary to provide a special supply of gas, stored in a separate holder; and until we are more certain as to the constitution of the gas, I do not see that much benefit can follow upon attempts to refine on the standard candle.

We have talked about the present, but what about the future of our industry and of our Institute? Both depend largely upon ourselves. The Institute has been subjected to a great deal of plain speaking lately; and some who are inclined to be bitter seem to forget that it is a mere inanimate thing that has been built up by the members themselves. In speaking against the Institute, we are simply reviling our own work and condemning ourselves. If there are glaring defects in it, such defects did not grow spontaneously, but were introduced gradually, it may be by the actions of the members themselves. In the Institute of to-day we have a

* See JOURNAL, *ante*, pp. 119, 768.

faithful mirror of the actions of the past, in which, as members, we have all had a finger. As in the past, so in the future, it can scarcely be said that any of our steps are irretrievable, or that if we have made any mistake the same is past remedy. The future of the Institute, gentlemen, rests with yourselves, and is just what you choose to make it. The remnant Council found the good ship "Gas Institute" in troubled waters, deserted by her commander and the majority of her crew; but, on a careful survey they found her A1, well fitted for a voyage, and in her hold a quantity of specie. Determined, if possible, to navigate the ship to port, they nailed their motto, "*Mens integra augustissima possessio*" to the mast, looked well to their lights, kept a good look-out for torpedo boats, steered by the compass of honour, and, after avoiding rocks on the one hand and shoals on the other, they now throw out a tow-line, and ask you to help them this day to drop anchor in the haven of peace.

Mr. T. Duxbury (Darwen) moved a vote of thanks to Mr. Garnett, not only for his able address, but also for his valuable services during the past few months.

Mr. S. R. Ogden (Blackburn) seconded the motion, which was put by Mr. Duxbury, and carried by acclamation.

The President, in acknowledging the vote, said he had not attempted to scale the lofty heights of science, to fathom the depths of philosophy, or to produce a brilliant literary essay. He came before the meeting as a practical man, and had endeavoured to give a practical address. If any portions of it proved of service, he should feel amply rewarded for what had been to him a labour of love.

The Birmingham Medal.

The President said the Council had determined from the outset to do their duty as far as possible; and, after the most careful deliberation, they had come to the conclusion that it was their duty to award the Birmingham Medal. They awarded it accordingly. They thought it could not go into better hands than those of Mr. Thomas Newbigging, a Past-President, They all knew his services to the work and literature of gas making; and he (the Chairman) felt sure that all the members would endorse the unanimous act of the Council. However, he had just received a letter from Mr. Newbigging declining to accept the medal; and he would ask the Honorary Secretary to read it.

Mr. Longworth then read the following letter:—

Geo. Garnett, Esq., M. Inst. C.E.,
President of The Gas Institute, London.

My dear Sir,—About the beginning of the present month I received intimation from a private source that the Council of The Gas Institute, acting in accordance with the suggestion of members, had decided to make me the recipient of the Birmingham Medal.

On the 6th inst., not having received any official notice of the intention of the Council, I wrote to Mr. Longworth, the Secretary, strongly expressing the opinion that, in view of the present crisis in the affairs of the Institute, it was in every way desirable that no presentation of the medal should take place.

The Council, it would appear, did not feel themselves in a position (having previously given notice to members of their intention to award the medal) to accept the advice I gave.

In the interval, a remonstrance against awarding the medal on this occasion, emanating from a number of subscribers to the fund, has been made public. I am aware that this remonstrance is not personal in its application, but is based on the general grounds of expediency at the present time.

Although I am of opinion that those who had signed the remonstrance have in their action exhibited a want of manliness and dignity, and that their protest might well be ignored by the Council, yet, the objection having been made, I should not, under the circumstances, feel comfortable in accepting the medal; and therefore I beg respectfully to decline it.

In a matter of this kind, sentiment counts for a great deal; and I should never be able to look upon the award, however justly it might have been earned, without being reminded of the unpleasant circumstances of the hour.

All the same, I beg to thank the Council and the members most sincerely for the honour they proposed to do me; and I feel sure that, whether they agree with my decision or not, they will rightly interpret my feelings in the matter, and believe that I have the interests of the Institute most deeply at heart.

I remain, my dear Sir,
Faithfully yours,
Thos. Newbigging.

5, *Norfolk Street*,
Manchester, *June* 17, 1889.

Mr. C. E. Jones (Chesterfield), as one of the founders and subscribers to the Birmingham Medal, took the earliest opportunity of protesting against the action of a section of people who were also founders and subscribers. He was requested to append his name to a document asking the Council either to withold the medal this year, or hand it over to some other body; but he refused to disgrace his signature by putting it to such a petition. He considered the action which had been taken by some of his friends was ill-advised, impertinent, and childish; and he said so in a letter to a friend, who, he was sorry to say, had withdrawn from the Institute, and therefore had no further right to interfere in its management. He regretted that Mr. Newbigging had been so "jelly-backed," and so sentimental as to listen to such an ignorant and foolish protest on the part of disappointed men. He (Mr. Jones), for one, declined to be a party to hampering the Institute in its bestowal of the medal, which was one of its greatest honours.

Award of Premiums.

The President then proceeded to present the premiums for papers read at last year's meeting; the first—a silver medal and £10—being awarded to Mr. W. A. Valon, of Ramsgate, for his paper "On the Use of Oxygen in the Purification of Coal Gas." He said the Council had been unanimous in making this award; and he was sure their action would be endorsed by the members.

Mr. Valon briefly responded; saying the prize would only stimulate him to greater efforts in the future.

The President next presented the second prize—£7—to Mr. John Somerville for his paper on the "Ventilation of Gas-Lighted Rooms."

Mr. Somerville having expressed his thanks,

The presentation of the third prize, which had been awarded to Mr. W. J. Dibdin, for his paper on "Photometers," was deferred until he should be present to receive it.

Mr. J. Whyte (Seaham Harbour) asked if it would be possible for Mr. Newbigging to accept the Birmingham Medal at the hands of the meeting.

The President said he should rule that a motion brought forward with the view of giving effect to this suggestion would be in order; but he must not be understood as giving any opinion that such a resolution should be passed.

Mr. P. Simpson (Rugby) asked if the conditions were not that the medal should be awarded by the Council?

The President said that was so. He might say that so confident were the Council that Mr. Newbigging would accept the medal, that they had had his name engraved upon it.

Mr. C. E. Jones pointed out that there was no motion before the meeting, and suggested that they should proceed to the next business.

The President remarked that the Scrutineers were about to examine the ballot-papers; and he therefore thought it would be as well to adjourn until two o'clock.

This was agreed to.

On the resumption of the proceedings after luncheon, the first business was the presentation of the

Report of the Scrutineers.

The President announced the result of the election o office-bearers for the ensuing year as follows:—

President.—George Garnett, of Ryde.

Vice-Presidents.—Joseph Hepworth, of Carlisle; William A. Valon, of Ramsgate; and Harrison Veevers, of Dukinfield.

Council.—J. Annan, of Wolverhampton; T. Bower, of West Hartlepool; R. Bridge, of Doncaster; John Carter, of Lincoln; S. W. Durkin, of Southampton; J. Lowe, of Weymouth; J. M'Crae, of Dundee; J. M'Gilchrist, of Dumbarton; and R. Mitchell, of Edinburgh.

Finance Committee.—W. D. Child, of Romford; W. W. Hutchinson, of Barnsley; and A. Mead, of Chelmsford.

Auditors.—W. Smith, of Hyde; and T. W. R. White, of Sherborne.

The meeting was then declared a special or extraordinary general meeting, for the election of Trustees and the alteration of the rules.

Election of Trustees.

Mr. D. Clarke (Ashton-under-Lyne) proposed Mr. Thos. Newbigging as one of the Trustees. He said members might be surprised at hearing his name proposed, seeing that he was one whose place had to be filled; but he (Mr. Clarke) had had some conversation with Mr. Newbigging the previous Saturday, and gathered from him that, although he resigned his seat on the Council, he did not intend to give up his trusteeship unless it were the wish of the members. Seeing, therefore, that Mr. Newbigging was willing to serve, if elected, he had much pleasure in proposing him.

Mr. W. R. Chester (Nottingham) suggested that, if Mr.

Newbigging had not resigned, it was not necessary to re-elect him.

Mr. RADCLIFFE said it was understood that Mr. Newbigging did at one time resign his office as Trustee; and there could be no harm, at all events, in re-electing him. It would be quite as well if his name were submitted to the meeting. It would, too, be more convenient if all three names were put up at the same time.

Mr. CLARKE said he would also propose the name of Mr. Peter Simpson, of Rugby, and that of the President, Mr. George Garnett.

Mr. CHESTER seconded the motion, and it was agreed to.

REVISION OF THE RULES.*

The PRESIDENT said the next matter on the *agenda* was: "To consider, and if approved, adopt, a resolution, which will be submitted to the meeting—'That the Council be empowered to relegate to the associate members and associate classes every extra-ordinary and ordinary member whose qualification is not in strict accordance with Rule 3 of the existing rules of the Institute.'"

Mr. C. E. JONES (Chesterfield) said he thought the meeting would agree with him that the thanks of the profession generally were due to the Council for the action they had taken during the past year. They were especially entitled to the highest appreciation for the disinterested motives with which they had acted, and for the valient manner in which they threw themselves into the breach caused by the withdrawal of several of their colleagues. He could not allow the occasion to pass, however, without expressing his high estimation of the moral virtues which the present Council possessed, and the excellent results they had promoted by exercising them. It had been his lot, with Mr. Newbigging—who he still hoped would see his way to accepting the medal which had been awarded him—to spend many days in compiling the rules which now governed the Institute. Those rules were not drawn up in a hap-hazard manner, but were adopted after careful deliberation; and he thought they had scarcely had a fair trial. It was always a sign of weakness when an Association began to tamper with its rules, and certainly when it did so under what might be called popular clamour. The rules which governed an Association of the character of theirs should be of such strength that they could afford to despise adverse criticism outside their own circle; and he had been both surprised and amused at some of the comments on what was termed the "remnant" of the Council, and the insinuation that an Association like the Institute, whose members were entrusted with millions of public money—which they managed pretty well, according to all accounts, as tested by the dividends they paid—was unable to conduct its own affairs. He had been highly amused at the suggestion that they, having existed for twenty-six years and done good work, were now unable to carry on their own business. Another objection against hasty legislation was that it was never done well; and when it was the result of a "crisis," as it had been so euphoniously called, changes were often introduced without being duly considered. Now, he should be very sorry, and he thought the majority of the members would also be sorry to do anything that day which would convey to the public outside that they were acting under a panic, or had done something wrong in the past, and were hastily taking steps to put things right. He would therefore move—"That the consideration of the existing rules, and the proposed amendments thereof, be adjourned for twelve months." By that time any feeling which now existed might have passed away, and the subjects be approached with calmer minds and clearer brains, when they would be in a better position to make any suggestions which might be justified by the circumstances. He commended his resolution to the meeting with every confidence that, if it was adopted, they would not regret it twelve months hence.

The PRESIDENT said he would ask the Solicitor if he would kindly put the resolution into form, which no doubt Mr. Jones would accept.

Mr. S. R. OGDEN (Blackburn) said he had much pleasure in seconding the proposition, which he thought it would be better to accept without discussion. He should not like to see the severance of those gentlemen who had been some of the greatest pioneers they had had—gentlemen who had read the best papers, and in every way had contributed to both the harmony and the intelligence of the meetings—severed from the Association.

Mr. T. DUXBURY (Darwen) said the duty of proposing the resolution placed on the *agenda* had been entrusted to him by the Council; and, so far as he was concerned, he was obliged to carry out instructions. But after what Mr. Jones had stated, and the resolution which he had moved, he thought perhaps the meeting would like to give the Council a little time to consider the matter. He should not like, at any rate, to take upon himself not to move the resolution, after having been instructed so to do, without consulting his colleagues.

The PRESIDENT said he thought the meeting would not object to allow the Council to retire for a few minutes to consider the matter.

Mr. D. BRUCE PEEBLES (Edinburgh) asked to be permitted to say a few words, as one of the extra-ordinary members. He felt himself in a very peculiar position; and it brought back his old school days, when schoolboys had to submit to punishment. He felt that day that he was threatened with punishment to which he decidedly objected without knowing what he had done wrong. He came there as an extra-ordinary member, and considered it a high honour that he had been one so long. As far as he knew, he had never said a word, or done a deed, to which anyone could take exception; and he did not see why he should be expelled, or relegated to a lower position than he had hitherto occupied. As far as the extra-ordinary members were concerned, he thought there was very little to grumble about. They had contributed largely to the papers of the Association; and if anyone took the trouble to look through the Transactions, he would see whether or not this was the case. With regard to the question of traders, which was the *bête noire*, he thought it was made far too much of. He had had the pleasure of attending the meetings in New York of the American gas managers, and had been a regular attendant at those of the Scottish Association; and those matters which had occasioned such a storm here had never ruffled them either in Scotland or in America, although trade was very largely spoken of at their gatherings. He therefore trusted Mr. Jones's resolution would be carried, and that he (Mr. Peebles) should be able to come amongst them, as he always had done, with the feeling that he was one of themselves. In saying this, he knew he was speaking the sentiments of a great many others. He had often wished he was a *bonâ fide* gas manager, so that he might consider himself more strictly a member of the Institute. However, he must say he had never yet met with incivility, but had always been received with favour. He hoped this would continue, and that the ship would soon be in full sail again.

Mr. GEORGE ANDERSON (London) suggested that it would be better if the Council did not retire until they had heard the general consensus of opinion on one side and the other from the members, as they would then be better able to come to a conclusion. He entirely agreed with the proposition of Mr. Jones. He had been a member for a great number of years, and had never seen anything wrong on the part of the associate members; and he wished them to continue. He did not see the slightest necessity for a change. Their friends who had left them had made a great mistake; and he thought the Council, in proposing these changes, had also made a mistake in going so far in knuckling down to them. Let them have another year of rest; and then, if necessary, they might make a change.

The PRESIDENT asked if any other gentleman wished to speak before the Council retired. He could assure them that full consideration would be given to everything that had been put forward.

Mr. DUXBURY said, after what had transpired, he should prefer to consult his colleagues on the matter, particularly with reference to Rule 2, which would exclude extraordinary members, and which he thought was the only point about which there would be much contention. The other alterations would, he believed, meet with the general approbation of the members; and it was highly desirable that something should be done with respect to the ruler. Mr. Jones said the rules had not had a fair trial; but they had been tried from 1881 to 1889, and had been "found wanting" in several very important particulars. One notable point was that the Institute had not been able to carry on its own business, or carry into effect the wishes of the members as expressed by a two-thirds majority which voted for expelling a member for what they considered to be a grievous wrong done. As to whether or not the justice of the case demanded this, he would not enter into that question; but if any member, no matter who he was, came and did something which two-thirds of the members thought was not the proper thing to be done, the Institute ought to have the power of expelling that member.

* The proposals of the Council in this respect were published in the JOURNAL, *ante*, p. 660.

Whether this affected the relegating or transferring of extra-ordinary members to the class of associates was another matter; but he was now referring more particularly to Rule 25 of the amended rules, which he would read. The words more particularly affecting the status of members, or rather the power of the Institute to deal with members, were these: "A majority of the persons present at such meeting, provided the number so present be not less than 50, who are entitled to vote, and shall vote." The Solicitor would tell them that these were the important portions of the rule; and if these words were inserted all through the rules, it would give them a power which at present they did not possess, and enable them not to be upset in law provided any member repeated what had been done on a previous occasion. On that ground alone he hoped this new rule would be accepted. With regard to the rest, however, although a great deal of trouble had been taken with them, he was sure the Council would desire a few minutes to consider how far they could comply with Mr. Jones's request.

Mr. Jones said he was not aware, when he moved the resolution, that the merits of the rules were to be discussed; but as the other matter had been introduced, he might be allowed also to speak on the merits of the proposed rules. One reason why he moved his resolution was that by the rule just read the un-English practice was adopted of trying a man in the dark, and executing him *in camera*. There was no discussion to be allowed—he was not to be heard. Supposing him to be a man who had not "the pen of a ready writer," or the tongue of a ready speaker, he was very likely to be condemned because he had not an advocate to defend him. A more plausible or sophistical reason was never advanced than that now put forward for postponing the resolution.

The President said it was exactly what was done in the Institution of Civil Engineers.

Mr. Duxbury observed that the rule was copied almost word for word.

Mr. Jones said he was not discussing the question of origin. It might have come from the Institution of Civil Engineers or from Timbuctoo, or even from Over Darwen; but it was palpably unjust for the Institute to relegate to the class of associates, extra-ordinary members who were elected years ago. He wished to bear his testimony to the good conduct of the associates and extra-ordinary members; and his idea was to blend into one all interests affected by the gas industry. The policy now to be pursued, however, was to split them up into sections. He should oppose such a policy as long as he could stand or talk.

The Council then retired for a short time. On their return,

The President said the Council had taken into consideration all that had been said by Mr. Jones, Mr. Peebles, and Mr. Anderson, and, having discussed the matter, had come to the conclusion that, as a Council, they were prepared to accept Mr. Jones's proposition of letting the resolution as to the relegation of extra-ordinary members stand over for twelve months, during which time they hoped to shake hands all round and become good friends.

Mr. Chester asked if the Council intended to bring the matter up again next year.

The President said the present Council were only six; and the new and complete Council would have to consider the matter. They could not promise for other people.

Mr. Peebles wished to ask, as their legal adviser was present, what right there was to exclude him. He said he had come to the meetings year after year; and if he had deserved punishment, he must have committed some crime.

Mr. Jones said his resolution did not aim at the expulsion of Mr. Peebles or any other member. It was that the consideration of the existing rules and the proposed amendments should be deferred.

The President said there were two or three alterations of the rules—for instance, Nos. 25, 26, and 49—which Mr. Duxbury was going to bring before the meeting; but, as far as the point affecting extra-ordinary members was concerned, the Council were prepared to accept Mr. Jones's proposition.

Mr. Jones said he must propose the resolution, as it appeared the Council were going to tamper with the rules. With all due deference, he did not believe Mr. Duxbury was in order in altering the rules without giving twelve months' notice; and he should divide the meeting on the matter. His resolution was that the consideration of the alteration of the existing rules be postponed for a twelvemonth. No possible harm could come from postponing this question until there was a full Council; and there had been more time for consideration. This resolution had been seconded by Mr. Ogden.

Mr. Duxbury said if the resolution were pressed, he should have to move an amendment, simply because they found it almost intolerable that certain things should continue. For instance, the new Rule 26 provided that casual vacancies on the Council could be filled up by them during the year. The position they had been in for some time was that there had been six members on the Council; and the whole onus and responsibility of the management had been thrown on these six. If they had had the power now sought, they would have been in a position to appoint gentlemen from different parts of the country to assist in the management when the other gentlemen retired; but they had been utterly powerless in the matter, and had had to bear the brunt of everything. The same thing might happen at any time; and, according to the present rules, certain members might come there and disturb them from meeting to meeting, and when an attempt was made to expel them it could not be accomplished. Rule 25 was exactly similar to one which was considered to be necessary by the Institution of Civil Engineers, which he thought they might safely take as a pattern. They found it necessary for good government to have a rule similar to this 25th rule; and the Council of The Gas Institute thought they should have the same power. With regard to the Rules 25 and 26, unless there were some minor amendments the members would wish to have introduced, he should like to carry them. They had been well considered, and had been the subject of long and full discussion. He should also like to carry Rule 49.

A Member: And 28 also.

Mr. Duxbury said Rule 28 was not of such vital importance; but, for the good government of the Institute, the three he had mentioned were absolutely necessary. If Mr. Jones persisted in moving his resolution, that the whole question should be adjourned for twelve months, he (Mr. Duxbury) must move an amendment to the effect that Rules 25, 26, and 49, as supplied to the members on the printed list, be substituted for the rules under the same numbers now existing.

Mr. Alex. Mitchell (Bury St. Edmunds) remarked that the first business on the *agenda* was the election of Trustees, which had been disposed of; the second was to consider this resolution: "That the Council be empowered to relegate to the associate members and associate classes every extra-ordinary and ordinary member whose qualification is not in strict accordance with Rule 8 of the existing rules of the Institute." To this resolution Mr. Peebles had spoken very effectively; and if they kept to it before wandering to the other rules, he believed it would be much better.

Mr. W. W. Hutchinson said he thought it had not been generally understood by the meeting that it had been determined by the Council that this matter should be, if not abandoned, at all events left over till next year.

Mr. Duxbury pointed out that Mr. Jones's motion went beyond the question of extra-ordinary members.

Mr. Radcliffe suggested to Mr. Jones that probably his purpose would be fully accomplished by limiting his motion to Rule 2. Rules 25, 26, 28, and 49 wholly referred to the machinery of the Council, and did not raise any question of principle. The members would probably be disposed to think that there might be circumstances under which the Council ought to be put in a position to carry out the wishes of the members. At present this had been found wanting; and it was to meet the difficulty that these amendments had been proposed. They did not raise any question of principle; they did not disturb any member in his position; and they ought not to offend or annoy anyone. It was merely machinery for carrying out the wishes of the members. He would therefore suggest that Mr. Jones's motion should be confined to the rules where the status of members was called in question.

Mr. Jones said he would accept the suggestion.

The motion, in the following form—"That the consideration of any alteration of the existing Rule No. 2 be postponed for a twelvemonth"—was then put, and carried with two dissentients.

Mr. Duxbury then said he desired, on behalf of the Council, to draw attention to the rules to which he had already referred. He hoped that the members would be unanimous in agreeing to accept them, and that there would be no captious opposition simply because the rules had been different in the past. If they were capable of improvement, let them be improved, so as to produce what they all desired—the good government of the Institute. He would move that Rule 25 be altered by the substitution of the following:—

In case the expulsion of any member, associate member, associate, or honorary member shall be judged expedient by twenty members, and

they think fit to draw up and sign a proposal requiring such expulsion, the same being delivered to the Secretary, shall be by him laid before the Council for consideration. If the Council, after due inquiry, do not find reason to concur in the proposal, no entry thereof shall be made in any minutes, nor shall any public discussion thereon be permitted; but if the Council do find good reason for the proposed expulsion, they shall advise the person proposed to be expelled to withdraw from the Institute. If that advice be followed, no entry shall be made on the minutes, nor any public discussion on the subject be permitted. But if that advice be not followed, nor a satisfactory explanation given, the Council shall call an extraordinary general meeting of members for the purpose of deciding on the question of expulsion; and if a majority of the persons present at such meeting, provided the number so present be not less than fifty, who are entitled to vote, and shall vote that such individual be expelled, the Chairman of that meeting shall declare the same accordingly, and thereupon the individual shall cease to belong to the Institute.

Mr. J. G. Livesay (Ventnor) seconded the motion.

Mr. D. Bruce Peebles asked if the words "extra-ordinary member" should not be inserted, seeing that they were now left as they were.

Mr. Duxbury agreed that the words "extra-ordinary member" should be inserted in the first line.

Mr. Jones said that this showed the folly of legislating in a hurry.

Mr. C. Sellers (York) said, from his reading of the rule, he thought there was a grave omission in it; and although he felt the responsibility of criticizing it, having heard that it was similar to the rule of the Institution of Civil Engineers, which they were told had worked satisfactorily, still he thought that it was quite possible that the rule in question had never been tested. An Act of Parliament was generally considered to be sound until circumstances came to test it, when it was very frequently found that a carriage-and-six could be driven through it. It seemed to him that there was a great gap in this amended rule—there was no provision made by which a party accused could be heard before his accusers. By the English law, a person accused was always heard personally, or by some one representing him; and it was very desirable that individual rights should be carefully guarded, and that they should adhere in this sense to the English law. Perhaps their legal adviser would be kind enough to say whether he (Mr. Sellers) was correct in his reading of the amendment, according to which it would be in the discretion of the Council either to give permission to a man accused of wrong conduct to defend himself or to withhold it, and they would be quite within the meaning of the language. If he were wrong, he should be glad to be corrected; and he spoke entirely in the interests of harmony and good fellowship.

Mr. Radcliffe said he could not conceive, under any set of circumstances, that any Council under the sun would come to a conclusion adverse to a person proposed to be expelled without hearing his case; but there might be instances in which the person accused was not there to be heard. Supposing, for example, a man did a disgraceful thing and fled the country, what was to be done then? The member who was proposed to be expelled had a pretty fair opportunity of being heard, because the Council, in the event of his declining the course proposed, were obliged to call an extraordinary meeting of the members, and a majority of the persons present—and the number must not be less than 50—must approve the action of the Council. It seemed to him, therefore, that there was every provision made for a man having a fair hearing. Of course, a resolution of this kind was passed to meet extreme cases; but he did not think there was a possibility of any Council going wrong.

Mr. Sellers observed that, in the rule as it stood, it was unmistakable that a person should have the right to be heard; and he saw no harm in inserting the same words in the new rule. It would remove the doubt which had presented itself to his mind.

Mr. Radcliffe said he did not see any particular objection to the words, except in the case to which he had referred (of which he had known an instance), where a man had fled the country. Still, if it was thought there would be any danger, the words could be inserted, though he thought in certain events they might be found to be an encumbrance.

Mr. Sellers said, with all deference, inasmuch as there was an evident difference of opinion as to the meaning of the language used, he thought it would be better to put in the actual words without further discussion; and he could see no objection to doing so. If the words now used meant what he wanted, there could be no harm in putting the language in such a form that all could clearly understand it. He did not wish to take Counsel's opinion on every difference that might arise. The rules should be as plain as language could make them, so that common-sense gas managers could understand them.

The President said he thought Mr. Sellers's object could be met without his moving an amendment.

Mr. Ogden said the old rules, as printed, had carried the members on for 25 years very comfortably; and there had never been any grievance until last year.

Several members expressed dissent.

The President said if Mr. Ogden wished to make a speech on this subject, he must ask Mr. Sellers to move an amendment; but he did not want amendments if they could be avoided, but for all to be unanimous. They had agreed on the insertion of words which he thought would meet Mr. Sellers's view. The second sentence in the new rule would read: "If the Council, after due inquiry, at which the person accused shall have the right to be heard, do not find reason," &c.

Mr. Chester asked, if the right to be heard would not apply to the extraordinary general meeting, would the accused person have a right to be heard by the whole body of members.

The President: It would be before the Council first.

Mr. Sellers said this would be all right so far; but ought not the same words, he asked, to be repeated in the latter part of the rule?

Mr. Radcliffe having again explained the operation of the rule.

Mr. Sellers asked if he understood that the member would have the right to defend himself at the public meeting of members.

Mr. Radcliffe said certainly, if he was a member; and until he was expelled, he would be one.

Mr. Sellers asked if an associate would have similar rights.

Mr. Radcliffe: Certainly.

Mr. Jones thought the rule, as amended, met the case; and he said he should give it his support.

Mr. W. Syms (Rochester) asked if it was clearly understood that at the extraordinary meeting a simple majority of one could expel a member. As he understood it, 26 votes to 25 would be sufficient.

Mr. Radcliffe said that was so.

The new rule, as amended, was then put, and carried *nem. con.*

Mr. Duxbury next moved that the present Rule 26 should be altered by substituting the following:—

The President, Vice-Presidents, and Auditors shall be elected annually at the annual general meeting. Any casual vacancy in their number, or in the Council, may be filled up by the Council; but the person so elected to fill up any such vacancy shall continue in office so long only as the person in whose place he shall have been elected would have been entitled to continue if he had remained in office.

He observed that it was necessary to strike out the words "Honorary Secretary" which originally appeared there, as the other alterations had not been proposed. It was absolutely necessary to make this provision, owing to the difficulties which had arisen during the past year; and other circumstances might arise which would make it equally desirable for such a power to be vested in the Council. Supposing, for instance, the President died during the year, there was no provision for filling up his place without calling a general meeting. It was very desirable that the Council should have the power of filling vacancies if they occurred.

Mr. Jones suggested that the word "shall," as originally printed, should remain, instead of the word "may."

Mr. Duxbury said the matter had been considered, and it was thought preferable to put the word "may." The vacancy might occur only a month or two months before the general meeting; and it might not then be thought desirable to fill up the vacancy, as they might elect a very capable man, who, under the other rules, would have to retire at the annual meeting, and be ineligible for another year. They did not propose to compel the Council to fill up the vacancy, but only to enable them to do so.

Mr. D. Clarke, in seconding the motion, desired to endorse Mr. Duxbury's remarks. During the last twelve months they had felt very strongly the necessity for such a rule; and he was sure that, now the members knew the position in which the Council had been placed, they would, without any hesitation, fall in with the proposition.

The President was about to put the resolution, when

Mr. J. Hepworth (Carlisle) rose to speak.

The President said Mr. Hepworth was out of order.

Mr. Chester said he wished to point out something.

The President said he also was a little out of order.

Mr. Chester said he would propose an amendment.

Mr. Duxbury hoped that the President would allow all

the members to give full expression to their views upon the matter.

The PRESIDENT said he was quite willing to hear every member, only he desired to keep things in order.

Mr. HEPWORTH said, Mr. Jones's motion as to the consideration of the rules having been withdrawn, they were beginning at No. 25, which had been carried, and were now considering No. 26. In this rule the words "Honorary Secretary" had been left out; but he desired to propose an amendment that the rule should include the words as originally printed. The effect of the withdrawal of Mr. Jones's motion was that they must go back now, unless they resolved to the contrary, to the consideration of No. 1, and go through them.

Mr. RADCLIFFE said Mr. Jones's motion, which had been carried unanimously, was merely that the consideration of the alteration of the existing Rule No. 2 be postponed for twelve months.

Mr. D. IRVING (Bristol) asked why they did not now consider the rules from the beginning; that was the practical course. Mr. Jones's resolution only referred to the second rule.

Mr. DUXBURY said this would have been the proposal of the Council; but, as they understood Mr. Jones's resolution was originally intended to include the other rules as well, they only desired that these few more important rules should be dealt with. At the same time it was not out of the power of the members, if they thought fit, to select any of the others, and present and carry them. He only made it a *sine quâ non* that these three or four rules should be submitted.

Mr. CHESTER said he wished merely to speak to the question of the Honorary Secretary. If this were left out now, it would have to be inserted at some future time, and the rule re-amended. It would be much better to decide at once whether they were going to have an Honorary Secretary, and, if so, include it in the rule.

Mr. C. S. ELLERY (Bath) said a great deal of time had been spent over the rules, and it would be a great pity if it were all to go for nothing, and they had to do the same thing year after year.

Mr. RADCLIFFE said he understood the general feeling of the meeting to be that the Council should not bring forward any resolution which would alter questions of principle, or be likely to give rise to differences of opinion. Then some member said there were two or three rules on which no question of principle arose, but which were very desirable to be carried in order to avoid the embarrassments which had arisen in the past.

Mr. HEPWORTH said he would move that Rule 8 be altered by the substitution of the following rule therefor:—

The Council shall consist of a President, three Vice-Presidents, twelve Ordinary Members, and an Honorary Secretary. Each Past-President shall also be *ex officio* a member of the Council for the period of one year from the date of his retirement from the office of President. Five to form a quorum.

Mr. T. W. R. WHITE (Sherborne) seconded the motion.

Mr. MEAD (Chelmsford) asked what would be the position of the three members of the Finance Committee who had been elected that morning. By the old rules there had, he said, to be a Finance Committee; but by this Rule 8 they were omitted altogether—they were not provided for.

Mr. DUXBURY said it was not intended to have in future a Finance Committee separate in any way from the Council; and notwitstanding the fact that they had been obliged to act under the old rules, and to appoint a Finance Committee, these gentlemen would merge into the Council after the present year. He might say that the object in altering the rule had been that there should be as few permanent or standing officers as possible—that the Council should be as changeable a body as practicable. This was one main object in going through the rules.

Mr. CHESTER suggested that before the resolution was put, the meeting was entitled to some explanation of the reason why it was proposed to have an Honorary Secretary instead of a paid Secretary.

Mr. DUXBURY said the matter had been considered very carefully by the Council; but it would not perhaps be wise to enter into all the conditions which had weighed with them in making this recommendation. They thought, however, that a man appointed from the members themselves, who could direct the affairs of the Institute, would give far more satisfaction to the members generally; and he would have a paid clerk who could carry out all the routine work. There would then be sitting at the Council-board a man appointed by the members, and responsible to them; and the members would be dealing with the man who was their own representative.

The resolution for the adoption of Rule 8, as amended, was then put and carried; and the resolution for the adoption of the new Rule 26 as originally printed, including the words "Honorary Secretary," was also put and carried.

Mr. DUXBURY said there was one other rule he should like to have amended; and this was the 34th, although he did not particularly press it. The object of this was to strike out the provision for compounding for subscriptions.

Mr. CHESTER asked if any one had compounded.

Mr. DUXBURY said he was not aware that anyone had; but such a thing might happen.

Mr. JONES said such a rule was very common; and, as far as he knew, there was not a single instance of a gentleman compounding being expelled. If anyone compounded for his subscription, he was not likely to transgress. At any rate, the same rule existed in the Institution of Civil Engineers, to which they had been referred.

Mr. DUXBURY said he would not press the matter. He then moved Rule 28, as follows:—

The appointment, suspension, and dismissal of the Secretary shall be in the discretion of the Council, who may determine his duties, and fix the amount of his remuneration.

Mr. JONES suggested that they should substitute the word "clerk" for "secretary,"

Mr. DUXBURY said they preferred to keep the word "secretary" and not "clerk."

Mr. HARRISON VEEVERS seconded the motion.

The PRESIDENT, in putting the resolution, explained that this was one point in which they had followed the practice of the Institution of Civil Engineers, whose theatre had been so kindly placed at their disposal. The Honorary Secretary there was Dr. Pole—a man to whom they could all look up, from the achievements he had won in science and its practical application. At the same time, the Secretary was a most able and energetic officer; and it was not desirable to take away from a man in this position the honourable title of secretary, and call him a mere clerk.

The motion was carried unanimously.

Mr. DUXBURY then moved the adoption of Rule 49, as follows:—

The members at any general or extraordinary general meeting shall have power to alter or add to these rules as they from time to time may determine; but in the event of any such alterations or additions being deemed necessary, notice of the same must be sent, in writing, on or before March 31 in each year, through the Secretary, to the Council, who may bring it before the Institute, if they think fit, and who shall be bound to do so on the requisition, in writing, of fifty members of the Institute. But no such alterations or additions shall be made unless supported by the votes of two-thirds of the members present entitled to vote and shall vote.

Mr. VEEVERS seconded the motion, which was carried unanimously.

Mr. RADCLIFFE then suggested that, to make things perfectly in order, a resolution should now be passed to the effect that the consideration of the alteration and revision of the remaining rules be postponed for twelve months.

Mr. S. W. DURKIN (Southampton) suggested that Rule 21 should be adopted.

Mr. ELLERY said they had already spent a considerable time over this matter, and personally he was quite prepared to go on, and deal with the whole of the rules. If the meeting did not approve of this course, it could be easily settled.

Mr. DUXBURY said he would move that the new Rule 21 be substituted for the existing Rule 21.

Mr. CHESTER seconded the motion, and it was carried.

Mr. JONES said he would move the resolution which Mr. Radcliffe had read—"That the consideration of the alteration or revision of the remaining rules be postponed for a twelve-month."

Mr. LIVESAY moved, as an amendment, that the consideration of the rules be continued, commencing with Rule 9.

Mr. R. P. THOMAS (Ware) seconded the amendment.

After a short discussion, the amendment was submitted to the meeting, and lost by a considerable majority.

The PRESIDENT thereupon put the resolution as moved by Mr. Jones, and it was carried.

The meeting then adjourned.

READING OF PAPERS.

On the resumption of the business the next morning, the reading of papers was proceeded with; occupying the whole of the day and part of Thursday. They were taken in the order given on the next page.

Wednesday.—(1) "Experience in the Manufacture of Oxygen in Gas-Works, and the result of its Practical Application to the Purification of Coal Gas." By W. A. Valon, of Ramsgate. (2) "On the Construction, Setting, and Working of Gas-Retorts, and on the Pipe Appendages connected therewith." By George Anderson, of London. (3) "A History of a Heap of Oxide." By N. H. Humphrys, of Salisbury.

Thursday.—"Purifiers." By George Anderson, of London.

These papers, together with the discussions thereon, and the necessary illustrations, will, as in previous years, appear in subsequent issues of the Journal.

Visit to the East Greenwich Gas-Works.

The President, before the meeting adjourned on Wednesday afternoon, announced that arrangements had been made by the Council to engage a steamboat which would be at Westminster Pier at two o'clock on the following day, when he hoped as many members as possible would go on a visit to the East Greenwich Gas-Works. They wanted to hold out the right hand of fellowship to Mr. George Livesey and everybody else. He wanted everyone to feel that the result of the present successful meeting was that they could afford to be generous. He might simply say, on his own behalf and on behalf of the Council, that they cordially reciprocated the good wishes which had been conveyed to them during the last twenty-four hours; and he thought the time had really come when, without any loss of dignity or sacrifice of principle worth having on the other side, a reunion might be, and ought to be brought about. (Applause.) He could only say, so far as he was concerned as President, and so far as those were concerned over whom, in the executive department, he should, all being well, have the honour to preside, that they were one and all of the same view, and that, at all events after this public expression of opinion, which would appear in all the technical journals, unless they were met in the same kind of spirit, they should simply go on as they had been going, and try to make the Institute a greater success in the future than it had ever been in the past. He hoped there would be a good attendance on the following morning, as there were some matters of importance to be settled—amongst others, the next place of meeting.

Place of Next Meeting.

Mr. Hepworth (Carlisle) said if it would meet the acceptance of the members, he should have great pleasure in moving now that the next meeting be held at Ryde, in the Isle of Wight.

Mr. H. Wimhurst (Sleaford) seconded the motion.

Mr. Duxbury supported the motion. He said it happened rather unfortunately that they should have had two meetings now in London; and it would perhaps be inconvenient for their northern friends that they should meet three times so far away. However, in all probability they would go north in the following year; and, under the circumstances, he hoped the members would agree as cordially as they could to come south even three years in succession.

The President said he was rather interested in this motion. He could assure the members that the Isle of Wight was a beautiful place; and as far as Ryde was concerned, in the words of the poet, it was a city that far excelled the common name that it bore. If they did him the honour to come to Ryde, he should be very glad to do all he possibly could to make the visit a success; and he should no doubt have the pleasure of introducing them to the Mayor. Even as far back as the days of St. Paul, the islanders showed no little kindness to those who came to their shores; and they would try what they could do. One great advantage was that they could give them a magnificent sea trip, which he was sure they would all appreciate.

The resolution was then put and carried unanimously, and the meeting adjourned.

At the close of the reading of the papers on Thursday, the general business was resumed.

New Members and Membership Changes.

The Honorary Secretary read the following list of members elected and transferred:—

Members.

Belton, J. C.	Wellington, Salop.
*Buckley, J. W.	Falmouth.
*Bromley, J. F.	Batley.
Fearnley, R.	Rastrick.
Figgis, S. E.	Ballarat, Australia.
Osmond, F.	Dorchester.
Reid, T.	Newcastle, N.S.W.
Whittaker, J.	Goole.

Associate Members.

Bancroft, J. F.	Barnet.
Lowe, W.	Weymouth.
Vincent, H. F.	Frome.
Wellington, S. N.	Norwich.

[* Transferred from the class of Associates.]

Votes of Thanks.

Mr. James Braddock (Radcliffe) then moved that the best thanks of the meeting be presented to the gentlemen who had read papers, for their communications. He said the resolution was one which so commended itself to all present, particularly at this critical period in the history of the Institute, that he need not add any further comment.

Mr. J. Whyte (Seaham Harbour) seconded the motion, which was at once put and carried unanimously.

Mr. J. Hepworth (Carlisle) said he had been entrusted with a resolution which he had framed in the following words:—"That the thanks of the Institute be presented to Messrs. George Garnett, William Longworth, David Clarke, Thomas Duxbury, Walter W. Hutchinson, and Harrison Veevers, for the able, arduous, and eminently satisfactory services they have rendered as members of the Council during the past year," He expressed his regret that he had to frame the resolution—he hoped it would be for the last time—in slightly different language to that ordinarily employed. They were usually able to propose a very cordial vote of thanks to the Council. But the Council elected last year was not the Council to-day; and it was a matter of regret to him that the President, from whom they had expected so much help, had not been able to see his way to remain at his post until the end of the year, when he might have restored to them the trust reposed in him a year ago, and told them of his differences, when they would have been able to discuss and deal with those differences. As it was, there was no actual communication from the late President before the meeting, which he, for one, very much regretted. All the official information they had came from the report of the remaining members of the Council, in which they were told that because a resolution proposing the winding up of the Institute was not carried, certain gentlemen felt it incumbent upon them to resign. So long as they existed, dissolution was always within the range of possibility; but he did not think the dissolution of the Institute was "within the range of practical politics" just now. Amendment was always possible; and it would have been in the power of Mr. Henry Woodall and those associated with him to have materially assisted in the amendment which had been made during that meeting, and might perhaps be carried further in future. At any rate, it would have been in their power to have rendered assistance in this direction. He, for one, did not think they had yet arrived at the period when they should "rest and be thankful." If it were necessary to amend the constitution of, or even to dissolve the Institute, he hoped that at all events it would be the act of the majority and not of the minority. He had not said one word—because it was not in his heart to think it—which would reflect upon the motives of those who for the time had left them. They could respect their motives; and if they had made a mistake, he could only say they were all liable to err. While he did not think those who had left had taken all the good judgment and wisdom with them, he should be sorry to think they had left it all behind them. He hoped, therefore, that the words so heartily spoken by the President on the previous day, and so heartily appreciated and endorsed, with reference to those members who had seceded, might have the effect of inducing their friends to reconsider their position, and come back and help to make the Institute what it ought to be, and what it might be made by the united efforts of those who remained and those who had left—he trusted only temporarily. He cordially moved the resolution he had read. As had been said already, the year had been one of no little difficulty; and though he did not think the gentlemen named in the resolution were at all desirous of having their difficulties and duties very much enlarged upon, the members must all feel that they had worked this year under most difficult circumstances, and at times under great discouragement. Happily those times were passed; and they had to thank these gentlemen for bringing them out of the difficulties, and landing them in the position in which they now were. Whoever might be called upon to aid in

the management of the Institute in future, the names embodied in the resolution would always be remembered as having done great service to it at one of the most critical periods of its history.

Mr. T. O. Paterson (Birkenhead), in seconding the resolution, said the duties of the Council during the past year had certainly been of a most difficult kind; but it had been shown from time to time that the members, as a whole, had been quite satisfied with the way in which those duties had been performed.

Mr. C. E. Jones (Chesterfield) said that he rose with much pleasure to support the motion. It was noticeable, in the history of this country, that whenever any difficulty was encountered, there always rose up some man who pulled her through. They had been in difficulties, and the gentlemen whose names appeared in the resolution had pulled them through. He did not wish to throw stones, or to say one word that would wound the most tender susceptibilities of any gentleman in or out of the Institute; but he considered —and he thought he ought to say so, feeling, as he did, that that most wicked proposal for the dissolution of the Institute had been swept away—that their thanks were heartily due to those gentlemen who had avoided the catastrophe. To talk of dissolution when they saw the vitality of the Institute was absurd. He was very pleased indeed to be present to support the resolution; and he was sure the members, from one end of the kingdom to the other, would endorse the observations which had been made. They were indebted to the President and his colleagues for having steered their old boat between the icebergs on the one side and the volcanoes on the other; and he hoped that next year they would all arrive in a safe haven in the Isle of Wight.

The resolution was put by Mr. Hepworth, and carried unanimously.

The President, on his own behalf and that of his colleagues, thanked the meeting for the enthusiastic manner in which they had accepted the resolution so admirably moved and supported. They did not want to receive any more thanks than they really deserved; but it was only fair that he should say that the "remnant Council," as it had been called, had done some hard work. It was no slight thing to get six people together from different parts of the country, sometimes every fortnight, for the purpose of holding a meeting, when it was known to everyone that, unless all were present, there would not be quorum to pass a legal resolution. He did thank all his colleagues for the hearty support they had given him. Indeed, they had gone in for one special purpose. They found the ship in difficulties; they manned her, steered her, and carried her into port; and he asked them all to help drop anchor in the haven of peace which had been alluded to. They had carried the ship through the narrows, and the anchor was now dropped—he hoped in good holding ground. Individually and collectively, the Council now made their bow; thanking the members very heartily for the unanimous way in which they had passed this vote of thanks. They might rely upon it that those who had been referred to would form the nucleus in the new Council which was going to carry on the work. He trusted there would now be nothing but plain sailing; but one thing was certain—they had made up their minds that they would abate nothing of their energy or of their purpose, but that they would steer in precisely the same course, and would carry as their motto one of the best to be found in the New Testament: "To him that knoweth to do good and doeth it not, to him it is sin." This was their motto for the coming year.

Mr. J. Lowe (Weymouth) moved a vote of thanks to the Scrutineers.

Mr. T. Giles (Bridport) seconded the motion, and it was carried unanimously.

Mr. H. Wimhurst having briefly responded,

Mr. D. Bruce Peebles said he had another vote of thanks to propose; but before doing so he wished to say a word or two. When one commenced a journey, it was not always easy to forecast what would happen before the end of it was reached; nor when a book was begun, was it safe to pass judgment upon it until it was finished. A great many of those present had left their homes to come to that meeting, wondering what was going to happen; and they must all feel highly gratified that, under the genial eloquence of the President, they had got on so well. He came there feeling there was a sentence of death upon him. It was an open secret that the extra-ordinary members were to be asked to resign; and it was suggested that it would be a very honourable and grand thing for them to do so. At the same time it was hinted that they would be able, perhaps, as a matter of courtesy, to pick up a few of the crumbs that fell from the table afterwards. To adopt the simile which the President had used, it was all very well for the captain and the crew to cast overboard part of the cargo to save the ship if possible; but it was not a very nice thing to ask the cabin passengers to throw themselves overboard, with the prospect of being towed along for a considerable time, and then taken on board again and relegated to the steerage, where, by courtesy, they might have a little of the cabin fare sent forward. He hoped and trusted that the resolution which had been postponed for a twelvemonth would not be brought forward any more. He now begged to propose a vote of thanks to the Institution of Civil Engineers for permitting the use of their room, and to Mr. Forrest (the Secretary of the Institution) for the arrangements he had made for the comfort of the members. They must all congratulate themselves on having such a magnificent hall to meet in; and the arrangements made for the convenience of the visitors must have been patent to all. This had been a sort of battle-ground; but he hoped the olive-branch would be hung up in the doorway when they met again.

Mr. W. Smith (Hyde) seconded the proposition.

The President, in putting the motion, said those who were members of the Institution of Civil Engineers must have always found in Mr. Forrest not only a very energetic officer, but one who took a great deal of trouble, and put the whole staff of the Institution at their service for the purpose of carrying out these meetings successfully.

The motion was carried unanimously.

Mr. Duxbury said he had been entrusted with the next resolution; but, before moving it, he should like to say one word in reference to what had fallen from Mr. Peebles—that he hoped they would hear nothing further of any alterations in the rules. One or two further amendments would, he believed, have to be made next year, in order to render the rules complete; but, with this exception, he agreed with Mr. Peebles. Coming to the motion, he would say that the Council were much better aware than the members were of the duties which had devolved upon the Honorary Secretary *pro tem.*, Mr. William Longworth—since last December, at any rate. It had not been an unusual thing for them to have from him once or twice a week, a batch of 25 or 30 letters, which had been received from members; and the number of letters he had had to write himself must have been enormous. There was scarcely a member of the Council who had not had 400 or 500 letters during the past six months; so that the work which had fallen on Mr. Longworth had been very heavy indeed. He had got through it with an amount of energy and ability which must have commended itself to all; and he was not only entitled to their hearty thanks, but the Council were of opinion that his services ought to be recognized in a more tangible form. He did not put it on the ground that they had saved so much in the Secretary's salary, but he might mention that on the balance-sheet the large sum of £3 4s. 1d. was all that appeared for extra clerical assistance. This was a very small sum indeed; and he was sure they would all heartily concur in the motion he was going to make—that 50 guineas be voted to Mr. Longworth, in recognition of the services he had so ably rendered. This amount was not fixed with the idea of paying him for his services, as might have been the case if he had mentioned twice or three times the amount, but simply as a recognition of them; and for this reason he proposed the resolution.

Mr. R. Mitchell seconded the motion. He said he would not enter into a detailed statement of the numerous letters and communications Mr. Longworth had had to deal with during the six months he had held office; but one thing was certain —that all he had done had been done to the satisfaction of the Council, and he believed to that of the members generally.

Mr. J. Whyte suggested that the amount should be made 100 guineas. Everyone, he said, felt a deep debt of gratitude for the position in which the Institute stood that day; and they must also feel that this was in great measure owing to the zealous manner in which Mr. Longworth had discharged the arduous duties which devolved upon him.

Mr. Duxbury said, as far as he was personally concerned, he should be delighted to accept such an amendment. They all knew Mr. Longworth was a very modest man, and accordingly a very modest sum had been named; but it was a matter entirely for the members.

Mr. Irving then moved, as an amendment, that the amount be 100 guineas.

Mr. H. Wimhurst seconded the amendment.

Mr. S. W. Durkin, in supporting the amendment, said it would be very unfair that Mr. Longworth should be at all out of pocket.

The amendment having been put and carried,

The President said that he would now put the resolution in the amended form—"That our best thanks be given to Mr. Longworth for his services as Honorary Secretary *pro tem.*, and that an *honorarium* of 100 guineas be paid him in recognition of the services he has so ably rendered." He could not sit down again without saying how deeply obliged he had been to Mr. Longworth, and how much he coincided in the amendment.

The motion was carried unanimously.

Mr. Longworth said it was a great pleasure to him to receive this expression of confidence; in fact, he should have been very well pleased to have had a vote of thanks, without any emolument whatever. There had certainly been a superabundance of work; but the assistance he had had from his colleagues had rendered it as easy as possible under the circumstances, while the words of sympathy he had received from the members had acted as a powerful tonic and incentive to him. He could not say all that he felt on the matter; but he thanked his colleagues and the members most heartily. He could not sit down without referring to the very great help he had received from his assistant, Mr. Tilley, in carrying on the work.

Appointment of Honorary Secretary.

Mr. D. Clarke (Ashton-under-Lyne) said the next duty was one which devolved upon the members in consequence of the alteration of the rules—viz., the appointment of an Honorary Secretary. He fully endorsed all that had been said by Mr. Duxbury and others with reference to Mr. Longworth; and he did not know that it was necessary to enlarge upon it. He would therefore simply move that Mr. Longworth be elected Honorary Secretary to the Institute for the next twelve months.

Mr. C. E. Jones seconded the motion, which was at once put, and carried unanimously.

Thanks to the President.

Mr. G. Anderson next moved a vote of thanks to the President, for the very able manner in which he had conducted the business of the meeting. Any outsider who attended the meeting would not have known unless he had heard it from their own lips, that there had been any preceding difficulties. Possibly the very fact of there having been some difficulties in the way of the Council had put the members into that happy frame of mind, in which they were determined to stand up for their fellows who had stood by them when there was a fear of their being dissolved. It showed that there was a great deal of vitality in the Institute; and, in the presence of a citizen of the great Republic across the water (Mr. Page), he would say that they were virtually a little republic there. Some kings and princes had run away—and in many cases, when a revolution took place, the people would be very glad if they did—and they had lost them for the moment, and were sorry for it; but they had done nothing to prevent them coming back. They were all liable to make mistakes. Those gentlemen had, no doubt, acted to the best of their judgment at the time; but he thought they would now recognize that the Institute retained a great deal of vitality, constituted of men quite fit for them to associate with. They were something like an animal which was said to be very low in the scale of organization—the crab—which, if a claw were knocked off, would actually grow another. It seemed as if they could spontaneously rise out of any difficulties into which they had fallen, and appear to all outside observers as big as they were before. Seeing that they had had such an amicable and successful meeting, the best they had had for many years, though they had had business to do which in former years had proved very troublesome—namely, to make alterations in the rules, which, when completed, would put the Institute in a better position than it had ever been before, inasmuch as their predecessors had not the same knowledge that they had—he hoped their absent friends would see that they were a highly respectable body, amongst whom it would be no discredit to come; and he thought the sooner they came back, the better it would be. He asked the members to pass a hearty vote of thanks to their worthy President for the trouble he had incurred in taking command of the ship when the captain ran away, and for the way in which he had conducted the business of the meeting.

Mr. R. P. Thomas (Ware) seconded the motion, which was carried by acclamation; the whole of the members rising to their feet.

The President thanked the meeting as heartily as possible for the great compliment which had been paid to him. He also thanked them for the many kind words which had been spoken, and for the heartiness with which they had been received. He had only one post allowed him for reply when he was asked by the other members of the Council if he would take the chair. Like any man who understood his business, he consulted his wife; and she advised him, as he had had some amount of experience as Chairman of the Ryde School Board, where he had to control somewhat conflicting elements, to accept the office if he thought he could do any good. If he had been able, in any degree, to advance the comfort of the members, he was quite satisfied. He might have been a little sharp in his conduct of the business; but his experience had shown him that if there were any chance of difficulty arising, it was much the best way to be decided. He could assure the meeting that he had not in any instance ruled improperly. He had in his pocket Mr. Palgrave's excellent little work called "The Chairman's Handbook;" and if his ruling had been in any point challenged, he was prepared to justify it. Once more he would tender his hearty thanks for the support which had been accorded to him, and would conclude by expressing a cordial wish for the prosperity of the members, and the hope that he might meet them all next year at Ryde, when they would have the opportunity of giving the final blow to the rivet which was going to fix the Institute aright, and put it in a condition to stand every test which could by any possibility be applied to it.

The proceedings then closed.

The Rating of Water-Works in Scotland.—Last week a petition was presented to the House of Commons from certain Royal and Parliamentary burghs of Scotland, praying for an alteration in the valuation of water undertakings.

Death of Dr. Percy.—We regret to record the death, last Wednesday morning, at the age of 72, of Dr. Percy, one of the most distinguished scientific metallurgists of this country, and for 28 years Lecturer on Metallurgy at the Royal School of Mines. Dr. Percy was originally a member of the medical profession; but left it to devote his attention to the branch of science with which his name became identified. In 1877 the Iron and Steel Institute recognized Dr. Percy's services to metallurgy by the award of the Bessemer Medal; and only shortly before his death he held the presidency of that Institute, and, notwithstanding his failing health, discharged the duties of the chair with characteristic ability. For more than a quarter of a century he practically directed all the metallurgical teaching in this country; and nearly every assayer of scientific reputation had passed through his laboratory. Up to the time of his death, Dr. Percy was Superintendent of Lighting and Ventilation in the Houses of Parliament—a position in which he will most likely be succeeded by Mr. William Prim, who for the last 21 years has been his assistant.

Mr. J. A. Wanklyn on "Water Analysis."—It is now nearly a quarter of a century since Mr. J. Alfred Wanklyn produced, with the co-operation of Mr. E. T. Chapman, his little treatise on "Water Analysis," the seventh edition of which has lately been issued by Messrs. Trübner and Co. Most of our readers are doubtless acquainted with the book, the publication of which followed, almost as a natural consequence, the introduction by its principal author of the ammonia process for the examination of water, the explanation of which was its chief purpose. It is not necessary to discuss the merits of the process, which by this time has "lived down" the adverse criticism it met on being first brought forward, but rather to call attention to the work dealing with it. The latest edition of the book does not differ very materially from its immediate predecessors. The contents are divided into three parts—the first treating of water analysis for general sanitary purposes; the second dealing with special analyses, &c.; and the third giving examples of complete mineral analyses. The first part has not undergone any change; but the second has been extended by the addition of a chapter on carbonic acid (a subject which, strangely enough, has hitherto been overlooked), and there is a new chapter on specific gravity. The latter is particularly interesting from the fact that for the first time a real connection between the specific gravity and the contents of a drinking water has been experimentally demonstrated. The third part has also been enlarged; and it now includes, in addition to the analyses of the natural waters supplied to the Metropolis, Manchester, and other places, some observations on those waters which have the property of dissolving and taking up the lead of the cisterns and pipes through which they flow. In an appendix, the author gives a history of the ammonia process, and reprints of some contributions to the chemical papers. The subject matter of the book is put before the reader in a clear and concise manner, and illustrated where necessary; forming a neat little volume which may be usefully consulted by all engaged in the analytical examination of water.

Legal Intelligence.

WESTMINSTER COUNTY COURT—Wednesday, June 19.
(*Before His Honour* Francis Bayley.)

MANLEY *v.* THE GASLIGHT AND COKE COMPANY.

THE ALLEGED WRONGFUL DISMISSAL OF A STOKER.

This was an action by a former workman of The Gaslight and Coke Company, who had been discharged without notice, to recover £3 17s. 6d. —two weeks' wages—in lieu thereof. Importance was given to the case from the fact that the plaintiff had been a leading spirit in the formation of a Trades Union among stokers; and it was alleged that the Company's officials had been really influenced by this fact in discharging him instantly for disobeying orders.

Mr. Ruegg appeared for the plaintiff; Mr. Besley for the defendants.

Mr. Ruegg having stated the nature of the action, and the amount of the claim, said the plaintiff had been employed by the Company during the greater part of last year upon a verbal agreement; but on Nov. 18 last, a written agreement was signed by the plaintiff—Mr. Beale, the Superintendent of the Beckton works, being the other party signing on behalf of the Company. By the agreement the plaintiff was to continue in the Company's service for seven days from that date; and afterwards from week to week—either party to give the other seven days' notice. Accordingly the plaintiff should have received that notice. He worked on until April 26, when he was paid his week's wages £1 18s. 9d., and started a new week on the 27th. A few hours after he commenced, he was dismissed without any notice, and without even being paid for the time he had worked. Even if the defendants were justified in dismissing him, he was entitled to £1 18s. 9d. for the week he had entered upon; but as it was then too late to give him "a week's notice to expire at the end of the weekly period," he could also claim in addition a week's wages in lieu of notice. Of course, the main question to be decided was whether the Company were justified in dismissing this man without notice, in breach of agreement. It was true no doubt that the agreement provided that the Company should be at liberty to discharge the man at any time without previous notice on account of impertinence or other misconduct; and, of course, the plaintiff would not be in a position to claim if the Company were really justified in discharging him on the ground of misconduct. No such cause, however, existed. What made this case of importance was the fact that this man had taken an active part in the formation of what was called a Gas-Stokers' Trade Union.

Mr. Besley: We have nothing to do with the Gas-Stokers' Union in this matter. That is no part of the question before his Honour. The sole question here is whether or not this man disobeyed a lawful order. We do not dispute, and we have paid into Court, the amount of wages earned by the man up to the time of his dismissal for disobedience.

Mr. Ruegg said it was necessary he should put his case before the Court. It was undoubtedly a fact that this man had taken a prominent part in the formation of the Gas Stokers' Union.

Mr. Besley: I must ask your Honour to say whether my friend has any right to make speeches upon an outside matter when the simple issue is, Did this workman obey an order or not? Of course, my friend desires to refer to the other matter—he would not be here but for that.

Mr. Ruegg repeated that he was instructed that the real cause of the man's dismissal was what he had stated—viz., that he had taken an active part in the formation of this Trades Union, which met with the disapproval of the Company.

Mr. Besley: Until I have shown that there is *primâ facie* ground by my cross-examination of the witnesses to impute such a motive to the Gas Company for turning the man away, my friend is not justified in introducing this matter here. It is merely a waste of time.

Mr. Ruegg said he was following his instructions in putting this point before his Honour. In addition to that, it appeared that Mr. Neal, the foreman, entertained a feeling of animosity and dislike to this man. Neal had some time before dismissed him; but upon appealing to another official named Mr. Kearns, he was reinstated, and Neal apparently did not like the snub he received. Early in the morning on April 27, he came to where the plaintiff was working, and told him he had not filled the retorts full enough. The plaintiff replied that he had put in them precisely what he had always done—two scoops and seven shovelfuls; and that it was impossible to put in more. The scoops weighed 1¼ cwt. each; and the fact was, when Neal came round, the particular retort referred to was quite full, and the coal was falling out of the mouthpiece. However, Neal seemed to think that this was the opportunity he had been waiting for; and he at once told the plaintiff to consider himself discharged. He then turned round to three other men standing by, who were also members of the Trades Union, and told them to put in more coal. They also said it was impossible; that the retorts were full, and would not hold any more; and that they had never put a larger quantity in. They, too, were immediately discharged, though two of them were afterwards taken on again. The plaintiff made no appeal to be taken back, knowing that it was of no use, after he had taken so active a part in the formation of the Trades Union, to again appeal to Mr. Kearns. He was not only instantly dismissed from his employment; but the Company had not even paid him his wages for the time he had worked that morning. Of course, the onus lay on the defendants of proving that they were justified in dismissing this man summarily; and the plaintiff's case was that the charge of not filling the retorts full enough was a mere excuse for dismissing a man who had become obnoxious to the Company and their Engineer, on account of the active part he had taken in forming the Trades Union among their workmen.

Michael John Manley, examined by Mr. Ruegg, said he had been in the service of the Company as a gas-stoker on and off for eleven years past at the Beckton Gas-Works. Neal was the foreman who told him to put more coals into the retort; and he had previously had a quarrel with him on account of the Union. Mr. Kearns and Mr. Diebel, two of the officials, discharged him at the time for agitating among the men. They said he was discharged for misconduct. He put the matter before Mr. Trewby, the General Manager; and he reinstated him.

Mr. Besley: I really must interrupt. This has nothing to do with the present claim. You must keep to the ordinary forms of law. I protest against you going into this evidence.

Mr. Ruegg: Now tell us what occurred on this occasion. Was the 26th of April the end of your week?

Witness: Yes; on that night I was paid, and started again next day for another week.

Mr. Besley: At 6.15 on the Friday, you would commence another week?—Yes: that was the beginning of the new week.

Mr. Ruegg: What happened on Saturday morning, the 27th?

Witness said that the foreman Neal came up, and asked him to put into the retorts the cannel which had been left out. The cannel was exceedingly large; but he said he wanted it put in. This, witness told him, was impossible. The retort was full up to the mouth; and the coal was falling out. Four barrows of cannel were brought up for the retorts on that morning. Some of the cannel was left on the ground as the retort would not hold it all; the lumps being so large. Neal said he wanted two scoops and twelve shovelfuls put in the retort. Two scoops would be more than 3 cwt.; and twelve shovels were five more than he had ever asked the men to do before. It was, in fact, impossible to get that amount into the retort. When Neal requested him to do this, witness said: "It is a thing that is impossible; the amount has never been put in before. You have never asked me to do it before; and why do you ask me exceptionally to do it this morning?" He replied that they were his orders. While they were talking about it, the foreman, Mr. Diebel, came up; and as he wanted the cannel put in, witness told him he could not get any more coal in. He then told witness that, after he had finished the six retorts, he might consider himself discharged. That night witness went to see the Manager; but he could not find him. He went again on the Monday morning, and asked the foreman whether he would put him to work; and he said he would have nothing to do with him. Plaintiff went again on the Tuesday morning; and he said the same thing, adding that he had better go and see Mr. Kearns or Mr. Beale. He went and saw Mr. Kearns, who told him that he was the leading agitator.

Mr. Besley: No, no. After the discharge we cannot admit conversation between officers of the Company and this man.

Mr. Ruegg: It is to show motive; and in that sense it is relevant.

Mr. Besley: You are asking his Honour really to fix upon the Company a malicious motive, and suggesting that they were pretending to dismiss the man for one cause, whereas they were, in fact, discharging him for another. I do not see how it can be evidence.

His Honour: Yes; I think it is.

Mr. Ruegg: What did Mr. Kearns say?

Witness: Mr. Kearns said I was the leading agitator among the men; that I had them all under my thumb; that I could do as I liked with them; that he wanted to get rid of me; and that I was liable to a prosecution for what I had done. I told him if I was liable to a prosecution they could prosecute me. I afterwards took the agreement down to them, and read it out. I told them I had broken nothing in it; but if I had done anything that rendered me liable to a prosecution, I was willing to be prosecuted.

Cross-examined by Mr. Besley, witness said it was at half past three on the Saturday morning that Neal spoke to him. He was working in a gang with men named Fleet and Penfold at the retorts. He put down his rake, and went to Neal and asked him if he was going to have any cannel coal for the last draw as usual.

Mr. Besley: Did you say, "If you give us three barrows we will put them in; but if you give us four, we have come to the conclusion that we will only put in two scoops and seven shovels?"

Witness: Yes; I did say that. Neal said the cannel would be put down for the three mouths as usual—that the quantity would be the same as usual. The gang went on working till half-past four, and again charged the three mouths of the retorts over which they had control. When Neal wanted the coal left over put in, witness did not say he would put it in if the others did. Neal told him to be careful what he was saying. When Mr. Diebel came up, and told him to put in the cannel, he did not say he would not, but that it was impossible.

Did Mr. Diebel say, "That answer will not do for me, I want to know whether or not you will put the cannel in;" and did you say, "No, I shall not?"—No, I said it was impossible.

Re-examined: Witness told the foreman more than once that it was impossible. Neal could see the coal falling out of the mouth of the retort. The usual quantity of coal could not be put in, because of the lumps being so large. More could be put in when the lumps were small, because of the spaces left between the large pieces, which also blocked up the mouthpiece. They could not quite get in the two scoops and seven shovels. It was unusually large coal. There used to be men to break it, and then they put more in; but that particular morning it was not broken.

W. Fleet said he was working at the retorts with the plaintiff. They put in two scoops and seven big shovelfuls. The retort was so full that they had not room when the foreman came up to turn the scoop, which he and another were holding against each other. Two scoops and seven shovels were what they usually put in. The cannel was larger than usual, and there was no one there that morning to break it. After they had finished charging, the foreman Neal came up, and said he wanted the cannel left on the stage put in; but it was impossible to get it in. He was not impertinent to Neal. He had joined the Union. The retorts were all made one size; but they got scurfed up, or clinkered. The foreman had never said anything to them before that morning. He was discharged for the same alleged reason as Manley.

Cross-examined: Witness had worked in a gang with Manley since a month before Christmas. The gang had to fill 84 retorts for the day's work; and if they did more they were paid overtime. He did not know anything about the men's requirement to make the number of retorts 72, instead of 84, and get the same wages. In hot weather it was too much for any man to do 84 retorts within the working hours. They went on in two gangs at 6.15; and the first draw was at 6.40. Then they worked on until 7 o'clock, and rested for half-an-hour in the lobby. They left off at 11.30, and rested until 1 o'clock. In that way the two gangs worked on. They were apportioned so that they could occasionally make overtime. He had not known men complain to the foreman that they did not get the same chance of making overtime as the others did. No complaint was made on the Friday morning that they had purposely kept cannel out of the retorts. Labourers brought up the coal in barrows. If they reduced the quantity of coal that was put in during twenty-four hours, they had a surplus of coal on the stage. Before the Saturday in question they had had coal left upon the stage; but no complaints were ever made about it. Up to half-past ten they made five draws, and after that time nine draws. He did not hear what Manley said to Neal. Diebel only came up after they had finished charging, about twenty minutes to five. He did not hear him say the quantity of coal had been put down as usual, and he wanted it put in the retorts; or Manley reply that, if others would do it, he would do the same. He did not hear Diebel say: "That answer will not do for me; I want to know whether you will or will not put the cannel in?" or Manley reply: "No, I will not."

Re-examined: When I told the foreman it was impossible to put more coal in, he said: "You can consider yourself washed up;" and before I had done washing, he sent down my ticket to take my money. I did not say one word about doing it if the others would do it. "Washed-up" meant "You can clean yourself and go."

Edward Penfold said he remembered the occasion in question. They had managed to get into the retorts two scoops and six shovels; and it was then full. They could not by any possibility get more in. They had had to leave coal out of the retort on other occasions. They never could get it all in. The foreman had seen it; but had never complained about it before. When he came up on that particular morning, he said to Manley, "I want that coal put in." Manley said he could not get more in. Manley was civil, and did not "cheek" him. He could see that Manley's retort was full, as they were working together. He was assisting Manley, but was not discharged. Since that time they had been putting

in two scoops and seven shovelfuls, and had left some of the coal out on the stage, but the foreman had never complained of it.

Cross-examined: Manley was a first-class, and Fleet a second-class man in the gang. Both for night and day gangs the usual working time was eight hours; and 84 mouthpieces had to be filled—the measure being the quantity of coal brought up for filling the retorts. If they filled more than 84 retorts, that would be put in as overtime. The gangs were changed every Sunday; so that they should not have all night work or all day work. As a rule, they were half an hour putting coal into the retorts, and half an hour resting in the lobby. Had often done more than 84 mouthpieces, and been paid extra. He did not hear Neal say to Manley, "You know very well you have always put in the quantity placed down until this morning." On the Friday there were not four barrows of cannel left which had not been put in the retorts; but only about a barrowful. He heard Neal say on the Saturday that he wanted the cannel put in. That was all he heard. He did not hear Manley say to Diebel, when told to put the coal in, "I shall not."

Re-examined: There was not the least truth in the suggestion that they had not filled the retorts, in order that they might be able to fill more than the 84 mouthpieces; and thus get extra pay.

Mr. Besley: Do you not think Mr. Ruegg you had better go into the box yourself, and give evidence, so that I may cross-examine you. I object to your giving the witness the very words you want.

Mr. Ruegg: He says there is no truth in that suggestion.

Mr. Besley: That is not my suggestion. What I say is that they can do 84 in the eight hours, and that if they do more they get overtime for it. Of course, if they do not fill the retorts, they accumulate a surplus.

Mr. Ruegg: I see the drift of your cross-examination. Your suggestion is that they leave the coal out of the retorts, in order that it may accumulate for filling them again, and thus obtain extra pay.

Mr. Besley: No; that is not it either.

Mr. Ruegg: Then I give it up.

Robert Morgan said that on the morning of April 27 he was working at the retorts opposite Manley. They were the same sized retorts within a little—there might be a difference on account of the scurf. He had managed to put in two scoops and seven shovels; and there was then more in the retort than there ought to be properly. Neal came up, and said he would have all the coal put in.

Mr. Besley objected to a conversation referring to what other men had done, as irrelevant to the present issue.

Mr. Ruegg: These other men were dismissed on the same morning from these works and ostensibly for the same reason—that is, for not filling the retorts.

His Honour: I do not think it is evidence.

Edward Douglass said he was working on this occasion, not in Manley's but in the other gang.

His Honour said the same objection would hold good to this witness's evidence.

Mr. Ruegg: Then that is the plaintiff's case.

Mr. Besley said if it were not that there was another question involved in this matter behind the issue actually before the Court, he would apologize for addressing his Honour at all before calling evidence; but he desired at all events to put The Gaslight and Coke Company right to this extent: Suggestions had been made as to the formation of a Trades Union among the men. The Company did not object to the men having a Trades Union. The men had a perfect right to do as they liked; and the agreement of seven days notice could be given on either side. The measure of the men's wages was an estimated period of work. During certain hours, they had to be at the works, though they were not working the whole of the time; and the filling of 84 retorts constituted their occupation during the eight hours' work, at wages of 5s. 6½d. per day for first-class, and 5s. 4d. for second-class men. They entered into an agreement that they would do any work they might be required to do. By the agreement, they might be discharged for misconduct; and they could not recover any money if they were so discharged. But the Company were not contending that they were not liable to pay the men for work done before the misconduct complained of; and it had been thought better to pay into Court the amount represented by the eight hours' labour on the Saturday up to the time of their discharge. The Company desired to be on the best of terms with their men; but it was essential to the carrying on of so huge a business that they should have their regulations. These men had agreed to fulfil their obligation of filling 84 retorts; they were not merely undertaking to remain on the Company's premises for a certain time daily. A second gang went to work with the first; and they interchanged with each other. The men had never considered the work too hard; and they had always done it as usual until this Friday when the week's work was completed. This gang had worked from half-past six on Thursday until the morning of Friday; and then it was discovered that for some reason or another, they had not put in all the coal supplied. Though they had now shifted their ground, and said it was impossible, they stated then, when complaint was made, that they would not do it, unless the other men would do it. They now said they could not put in any more coal than they had done the last time they charged the retorts. They were bound to do their work. It could be easily understood that they might throw aside big lumps of cannel; and thus accumulate a surplus. But that was not the thing. They were accumulating a surplus, because they did not charge the retorts hourly as they should have done. In that way they could easily accumulate a surplus. This man Manley—the head of the gang—had his attention called to the fact that they had not done what was required of them. At half-past three, he was seen by Neal, and told that they had not done what was right; and they had plenty of time to put in the coal between half-past three and half-past four. If they had absolutely avoided filling the 84 retorts during the night, that was a clear disobedience of orders. In numerous cases, to which it was not necessary to refer, it had been decided that as long as an order was lawful, disobedience was misconduct. These men were guilty of misconduct; and when a surplus of cannel was found on the stage not being carbonized, as they were bound to take care it should be, upon this being pointed out, that was notice to them. On all other occasions, they could fill the 84 retorts; but on this occasion they had neglected to use the amount of coal put out to be carbonized. They had always been paid for anything beyond the 84 mouthpieces filled. Plaintiff's Counsel had attempted to air the grievances of the Trades Union; but here was a body of men earning £2 and more weekly—this very man had made £2 4s. to £2 6s., and so on, in a week—and apparently the complaint was that this was not sufficient payment for them, with the amount of rest allowed; and they were only working eight hours a day. The Gas Company were obliged to maintain a certain amount of discipline among the men. They called Manley's attention to the fact that he was neglecting his duty. He was told at half-past three not to neglect this; and at half-past four after having said, "I will do it if the others will," upon being pressed again by his superior officer and asked, "Will you do it or not?", he said "I will not." What other course could the Company take? Their evidence would show that the man was justly discharged.

George Green said he was a scoop-driver in the service of the Company. The filling of 84 retorts was reckoned to be a day's work. If more retorts were charged, the men were paid extra. The filling depended on the size of the coal, and the energy of the men. On April 27, he saw Manley charging the last draw at twenty minutes to five; that was what was called the half-past four draw. He did not hear Neal speak to Manley at half-past three. At half-past four he came and said to plaintiff, "I want this cannel put in." Manley said, "I will put it in if the others will." He then walked over to his mates opposite, and came back again. Neal again asked him to do it, and warned him to be careful what he was doing; and Manley made the same reply again. All three of the gang were standing together; and, if they were not deaf, they could hear everything that was said. Fleet was also asked to put the coal in; and he too said he would put it in if the others did. Manley went back to his mates a second and a third time; and each time Neal told him he wanted the cannel put in, and to be careful what he was about. Each time Manley made the same reply—that he would do it if the others did; but not without. After the fourth refusal, Mr. Diebel came up, and said he wanted the cannel put into the retorts. Manley again made a similar reply. Diebel said "That is not an answer; will you put the coal in or will you not?" and Manley distinctly said "No." He was quite sure he said "No." Diebel then told him he would be discharged from the Company's service. At that time they had six more retorts to draw and charge. Out of the four barrows there was half a barrow full of coal left out. From first to last Manley did not say one word about its being impossible to put the cannel in. Nobody said a word about that, nor about the cannel being in large lumps. As to there not being room in the retorts for the cannel, in consequence of their being clinkered, they had been all fresh scurfed within the week, and made as good as they possibly could be. They were certainly not clinkered up.

Cross-examined: Witness was standing by Mr. Neal at the time near the retorts, but was not engaged in feeding them, though he had often fed retorts. He was not one of the men who joined the Union. He objected to it. He could swear that two out of the three retorts had been clinkered within a very short time. Large or small, the same number of barrowfuls of cannel were put on the stage for the retorts. The larger it was, the less weight could be got in. Did not notice that the cannel was larger than usual on that particular morning; and he was close to it. The men who had to handle it, and put it into the retorts, would not be better able to judge of its size than himself. They generally put in two scoops and ten or twelve shovelfuls. That was the usual six hours' charge since he had been on the works, when the cannel was broken up fine. Assuming it was not broken on this particular morning, it would make a difference, but it was quite small. He did not look into the retort to see whether it was full. The men had just shut the door; and he could not deny their statement that the coal had been actually falling out of the mouthpiece. They had put in seven-eighths of the coal, and left out one-eighth. The plaintiff said distinctly: "If the others put it in, I will." He did not say "If the others can." Witness heard no conversation with the other men. Fleet did not say it was impossible to put the cannel in, but that he would do it if the others would. Two men only had been dismissed—not four. Witness had seen cannel when it was large left out on the staging before, but not very often. Generally it was all put in; and he never heard a word of complaint about it to the foreman before that morning.

Re-examined: On that particular morning the cannel was very fine—fine enough to put in without being broken. Of the nine retorts in the set, the three top ones charged with cannel had been drawn. He had no doubt the coal could have been put in.

Eugene Neil said he had been 27 years in the Company's service. For five years he had been assistant foreman at Beckton, and had been recently made foreman. During the time he was the assistant, Manley had worked under him. Extra pay was given if more than 84 retorts were filled. Several gangs worked at each retort; three men working at 84 mouthpieces, which they had to go over twice to fill. That was reckoned to be a day's work; and the retorts were filled and drawn twice a day. As a matter of fact, there was room to put in the coal the men had left out. The retorts were not full of clinker. Two of them had been cleared; and there was not much in the other one. No more difficulty existed in filling them on this particular morning than on any previous occasion. He went up to Manley, and said: "Do you call that a six hour's charge? Do you always do this?" Manley replied, "I consider there is quite enough in it." Witness said, "You will have to look out one of these times." Manley had been paid for filling more than 84 retorts. No complaint had ever been made about the retorts not holding the whole of the coal. Manley came on at 6.15 on Friday evening; and, with Fleet and Penfold, worked through the night. At 3.30 on Saturday morning he put down his rake, came up to witness, and asked if they were going to have cannel for the last draw. On being told they were, he said, "Then give us three barrowsful. If you give us four, we have come to the conclusion that we will only put in two scoops and seven shovels." Witness replied that he could not help that; he must see that they put the quantity in. At 4.30 the cannel was still lying in a heap where it had been wheeled for him, instead of having been put in the retorts. There was room for more in the retorts. He told Manley to put the usual quantity in; and he answered: "I will if anybody else will." Then he ran across to the other gang. When he came back, witness told him to be careful what he was doing. Manley kept running backwards and forwards to the other men. He did not know what he said to them. Mr. Diebel came up, and gave him the same order, and he again made a similar reply. At that time the quantity left out could have been all put in. On Manley saying distinctly that he "would not" put it in, Mr. Diebel told him he might consider himself discharged from the Company's service.

Cross-examined: Witness had been foreman for nine months, and acting foreman for five years. Manley and Fleet had always been very good workmen, and no complaint had ever been made against them before. He did not know that Manley had taken an active part in establishing the Trades Union; but he knew he was connected with it. He did not object to the Union, but had not joined it, and did not suppose he should. The men who had to break up the cannel had been to look at this quantity; and, in their judgment, it did not require breaking up. They took their orders from the foreman before the scoop-drivers wanted the coal. He did not look into the retort, but knew it was not full, because the quantity put in would not fill it. He could see the "pack" of it; and there was plenty of room in front to put the shovel in. He saw the backer raking up, and the backing-rake come out. That was his reason for saying the retort was not full; and there was in addition half a barrowful of the coal lying on the ground, which could have been put in in two minutes. Witness had himself worked at the retorts with a scoop, the same as Manley. He did not tell him he was only giving him the orders he had himself received, or anything of the kind; but told him to be careful what he was doing. That, however, had no reference to Manley's position with regard to the agitation among the men. There were twelve retort-houses, and a foreman in each.

Re-examined: Witness had occasionally seen a lump of cannel left out; but had never before found men behaving as these men did.

Further cross-examined: Since that time the men at the works had come to a resolution only to put in two scoops and seven shovels, and that quantity only had been put into the retorts; but it did not fill them. The men had not been discharged for doing that, as they had come to that conclusion themselves outside the works.

Mr. RUEGG: Then why did you discharge Manley?

Witness: They had not come to the resolution at that time. After this man and Fleet were discharged, the men had a meeting among themselves outside the works; and they came to the officials the next morning, and told them they had come to that conclusion.

Did not they say it was in consequence of the injustice you had shown in discharging these men?

Witness said he did not know; he was not there.

Further re-examined: From the use of the rake, he could see there was space for the quantity left out to go in. He asked each of the men to put in his own share; and they had refused to do so before they were discharged.

Mr. *Diebel* said he had been 20 years in the Company's service, and had been foreman five years. He saw Manley and Fleet on the Saturday morning when the order in question was given them. They went and spoke to the other men, came back, and said they would put the coal in if the others would. On their persistent refusal, he discharged them, and reported to Mr. Kearns, who sent down the pay-ticket. The mouthpieces were free of clinkers; and the quantity was not too large for them.

Cross-examined: No other men were discharged on that day, but Manley, Fleet, and Morgan were not "knocked off" for a time. The distinction between the men was that Manley said plainly he would not put his coal in; while the others said they would put theirs in if the rest did. If Manley had merely said the same as the others, he would not have been discharged.

Re-examined; Manley never complained that the cannel was too large and that he could not physically get it all in.

Mr. *Kearns* said he had been Carbonizing Foreman in the Company's employ for four years, and in their service altogether 19 years. Neal and Diebel were under his orders. Manley's conduct having been reported to him, he gave Diebel instructions; and upon a second report the man was discharged and witness wrote out his ticket. He had never heard befor e that the cannel was complained of by the men as being too large to be put in the retort; and any such complaint would have been made to him. Witness told Manley the following Monday he could have got it in, and he had been rightly discharged for not putting in the usual quantity.

Cross-examined: Both Manley and Fleet were very steady good workmen. Ever since the time, in accordance with the stokers' resolution, two scoops and seven shovels had been the recognized quantity. Witness did not see the coal on the Saturday morning. If it was very rough, there were men to break it. The foreman was the best judge whether it required breaking. He did not know that Manley was discharged because he was the Secretary of the Trades Union; but he knew he had been running about among the men. The Union had nothing to do with the Company. He had told Manley that, if he intimidated the men, he could prosecute him. This man had been cautioned from time to time for leaving the retort-house and going round among the other men.

Mr. RUEGG: That might have been a very good reason for giving him the seven days notice, but he was discharged instantly.

Witness: The sole cause of the man being discharged was that he did not do his work.

You were very glad to have this opportunity of discharging him?—That is your story.

Is not it the truth?—Decidedly not.

Did not you tell him that your reason for discharging him was because he had influenced the men, or something of that kind?—Certainly not. The sole reason for his being discharged was for not putting his coal in. I could bring you a hundred gangs who would tell you they had always put in the same quantity of coal.

Re-examined: Some time previous to this occasion, he had spoken to Manley about running from retort-house to retort-house.

His HONOUR: What proportion would four barrows bear to the two scoops and seven shovels which the men now put in?

Witness: I should think there would be half a barrow left over, as near as I can tell.

Mr. BESLEY said he had the Resident Engineer in Court, but did not think it necessary to call him. That was the defendants' case.

Mr. RUEGG, in reply, said the matter was of considerable importance to workmen, and he contended that the Company had not shown they were justified in dismissing this man without the notice provided for by the agreement. Nominally he was discharged for not doing what was impossible in regard to putting more coal into the retort, but really because the Company had the idea that he was a firebrand in the works, going about among the workmen agitating for the purposes of the Trades Union; and accordingly they wanted to get rid of him. A proper way of doing this lay open to them; but they would not give him notice, or pay him a week's wages in lieu of it, because they did not want to have it said that they were dismissing a good workman simply because he was, as they said, "agitating among the workmen." They therefore unfairly looked out for the first opportunity of causing a complaint to be made against this man, who had never had a single complaint brought against him before during the time he had served the Company. They thought on this particular morning they had a good cause of complaint against him, finding that he had left a little coal on the stage. Over and over again, according to the evidence, the same thing had happened; but no complaint had ever been made of it before. It had been proved that on this morning the cannel had not been broken; but still the retorts had, in fact, been filled, until the coal was actually running out of the mouths. In consequence of the unjustifiable character of the dismissal of these men by the Company, under a sham pretext which the other stokers perfectly saw through, they had passed a resolution only to put in the quantity—two scoops and seven shovels—which the retorts would fairly hold. It was, in fact, in consequence of the ill-treatment of these two men that the league was formed.

Mr. BESLEY said the league had been formed months before.

Mr. RUEGG reiterated that it was clearly in consequence of the active part which the plaintiff had taken in forming the Union that he was dismissed.

Mr. BESLEY: That is contrary to the oath of every witness who has been called in the case.

Mr. RUEGG said the men had never been accused of disobedience before; and the only reason why they had left the coal out of the retort was because they could not put it in, though possibly, at the end of an angry discussion about it with the foreman, they might have said they "would not" put it in. In this matter a question of the greatest interest to all working men was at issue. Here was an admittedly good, steady workman discharged at a moment's notice under the pretext of misconduct, and the Court was now asked to clear him from the sham charge.

His HONOUR, in giving judgment, said it was clear the plaintiff was properly dismissed for disobeying a lawful order. A suggestion was now made that upon the order being given he said it was "impossible;" but the evidence was clear that he did not say anything of the kind at the time. Then it was said that a resolution to put in no more than two scoops and seven shovelfuls of coal was come to by the men before this difference arose; but this was not shown by the evidence. Neal stated that when the plaintiff came up to him he said for the first time, "We have come to the conclusion to put in no more than two scoops and seven shovels." This statement was apparently true. The Court was of opinion that the order at the time it was given to the plaintiff was a lawful order, and that it was wrongly disobeyed. This question was not in the least affected by the fact that the next day the stokers went to the Company and said they would strike in a body if their demand was not complied with. In any case, this took place after the event. Accordingly, as the plaintiff's discharge must be held to have been justifiable, judgment must be given for the defendants.

Mr. BESLEY asked for costs, as there was a Trades Union at the back of the men.

His HONOUR said he would allow the costs of the witnesses and Counsel's fees.

BIRMINGHAM POLICE COURT.—THURSDAY, JUNE 20.

(*Before Mr.* T. M. COLMORE, *Stipendiary Magistrate.*)

CHARGE OF STEALING FIVE MILLION CUBIC FEET OF GAS.

To-day *Henry Stephenson* and his three sons *Harry*, *Ernest*, and *Samuel*, who had been committed to Warwick Gaol in default of paying £4600 each and costs, penalties imposed by the High Court of Justice for making illicit whisky, were brought up, under a writ of *habeas corpus*, on a charge of stealing 5,490,048 cubic feet of gas, value £617 12s. 6d., the property of the Birmingham Corporation, between April, 1887, and July, 1888.

Mr. A. YOUNG appeared for the plaintiffs; Mr. STUBBINS, for the prisoners Ernest and Samuel; and Mr. HUGO YOUNG and Mr. G. H. CARTLAND defended Henry Stephenson and the son Harry.

Mr. YOUNG, in opening the case, said the alleged theft was supposed to have been committed between April, 1887, and July, 1888. He detailed the circumstances under which the Stephensons came into the occupation of the premises in Albert Street, which were used as an illicit distillery. In May, 1887, the defendants purchased certain gas-fittings from the Anchor Tube Company, which the Inland Revenue officers discovered attached to the gas-main on July 21 last year, when they found the evidences of the illicit distillation. They saw a tube attached to the street gas-main near the ceiling of the vault; and subsequently circumstances were revealed which led to the belief that the Stephensons were in the habit of drawing a free supply of gas from this source. The gas thus obtained was carried to the stills, and consumed through seventeen Bunsen burners. The pipe was so arranged that it could be removed very rapidly in the event of detection; and the tap which controlled the supply was easily turned by the fingers. It was further found that the gas-piping had been extended from the Stephensons' own service-pipe into vaults Nos. 1 and 33. He did not suggest that there had been any stealing of gas in this extension of their own service; but still the gas was extended to these vaults. On July 23, between three and four o'clock, the Stephensons having been alarmed, Samuel Stephenson was observed by those watching the cellar removing the gas-piping from around the area. After doing this he went into No. 33 vault, and remained there twenty minutes. That night the officers found the gas would not light in cellar No. 1, showing that it had been disconnected; but it still burned at the two burners in No. 2. On the 24th the officers made up their minds to go and see the Stephensons. They first saw Samuel Stephenson, and told him of the discovery of the illicit stills. He said it was all news to him. Afterwards Henry Stephenson and Ernest Stephenson affected equal surprise. The officers then went into No. 33 vault, and found that the gas-pipe had been disconnected there, no doubt by Samuel Stevenson on the previous day; and the end of the main pipe had been capped. At that time the elder Stephenson came in, and admitted that the vault was his. Samuel Stephenson was taxed with having taken the piping down in the area. He first of all denied having done so, and then admitted that he took it down by direction of his father, to prevent the children tampering with it. The father corroborated his son's story; but the fact was that the pipe was too high for children to reach. Mr. Green, the superintendent of the lamp department of the Corporation, was sent for, and refixed the pipes which Samuel Stephenson had taken down. They were found to fit exactly to the connections between the main and the cellars, from which they had been detached the day before. Mr. Green traced the course of the pipe, which went through the area; and also the course of the pipe from the main under the floor of No. 33, under the area, and through the wall into No. 2 vault—close to the place where the illicit stills had been in operation. It appeared to have been connected to the burner tubes by flexible piping. Upon examining No. 2 vault adjoining, it was found that a service which had been used for the adjoining premises had been tapped, and the gas abstracted for the purpose of lighting No. 2 vault; and also as an auxiliary means of heating for the smaller of the two stills. It seemed that after all these discoveries were made, efforts were tried by one or other of the prisoners to throw the officers off the scent, and to try to lead to the supposition that somebody else and not the Stephensons were the guilty parties. There were two letters in the disguised handwriting of Samuel Stephenson. One was headed Chester, July 30, and addressed to Mr. Stephenson. It ran: "Dear sir,—I am sorry there has been such a row, and caused you such bother. I have written to the Excise and explained all I can. You will never see me again. I shall be far away. I wish I had not done it, for your sake.—Yours, C. Thompson." Mr. Young said he had no doubt that "C. Thompson" was a person who had been utilized by the defendants for obtaining gas-fittings from various sources, and had actively helped to put up the gas-pipes. The second letter was also dated July 30, and headed Chester. It was addressed to Mr. Llewhellin, Superintendent of the Inland Revenue, and said: "Dear sir,—I have seen all the papers in connection with this, and I was the sole proprietor. Mr. S. had nothing whatever to do with the cellars; and I myself crept down and turned off and took down the gas-pipe. I fixed it all myself, and no one knew anything about it. I knew you were in the cellar. Thank God, I am clear away from you, on the ocean, days before you get this. You cannot get anyone in it but me; and it will puzzle you to find me. Yours affectionately, 'Whisky M.' C. Thompson."

Henry Crump, plumber, said he knew the premises recently occupied by the prisoners in Albert Street. In November, 1886, he went to the premises. He extended a water-pipe from the area through the wall to No. 1 vault, and then into No. 2 vault. The vaults were void at the time. He put a tap on the end of the pipe in No. 2. He got from No. 1 to No. 2 through a hole in the wall, there being no doorway or steps. While doing the work, Mr. Stephenson, Ernest, and Samuel, came to see him at work. He was five or six hours fixing the piping; and the vaults at that time were unoccupied. Stephenson said the tap was fixed in the right place. At that time the two sons were with him. It was a worm tap, containing a nozzle, so that an india-rubber pipe could be attached.

Clifford Billings, plumber's mate, who assisted the last witness to extend the water-pipe, gave corroborative evidence. He further said that to his knowledge the eldest Stephenson had borrowed gas-tongs from his (witness's) uncle on more than one occasion.

Arthur Leeson, foreman warehouseman to the Anchor Tube Company, stated that on May 7 he served an order to Stephensons of 49½ feet of gas-tubing, and certain fittings, including backnuts and a socket and union.

Mr. *A. J. Llewhellin* described the early morning visit to the Stephensons' premises on July 21, 1888, when he made the discovery of the illicit still. At the end of the vault No. 33, he noticed a bent pipe, 1¼ inches in diameter, fixed to the street gas-main. He forced the door of vault No. 1, and found two gas-jets burning in No. 2 vault. Underneath the wash-still he found a "gridiron" fitted with twelve Bunsen burners ready for use. Under the low wine-still was a ring-pipe fitted with five burners, and a 1¼-inch service-pipe came into the vault through the wall which divided the area from the vault, supplying the gas for these burners. There were no means of heating the stills except by the gas. On the afternoon of July 23, witness's attention was called to a man standing in the area and taking down some gas-piping. Witness knew by the man's voice that it was Samuel Stephenson. When witness tried the Bunsen burners the following night, they would not light. The next morning witness had an interview with Mr. Stephenson. The latter, in reply to questions, said he knew nothing of an illicit distillery on the premises; and further that he let the vaults some time previously to a man named Thompson. Witness and Stephenson then went to the vaults, and there Stephenson admitted that the vault under No. 33 was in his occupation. The key was brought by Ernest, and witness found that the bent gas-pipe seen on the Saturday to be attached to the street main had since been detached, and a plug placed in the pipe. The superintendent of the lamp department was sent for; and he traced the gas-piping from the connection in the street main in the vault under No. 33 to the illicit distillery in vault No. 2. When that had been done, witness said to Stephenson, "How can you explain that this gas is connected in this way, and leading into the distillery?" Stephenson replied that he could not give any explanation except that someone must have done it. Witness said, "How could anyone get in here and make the connection when you have the key?" Prisoner answered that several people could get in, as only a common key was used; but he could not name anyone else who had a key. The lamp inspector also traced another source of gas supply from adjacent cellars into vault No. 2, which seemed to supply the small still.

John Darby, detective-officer, testified to having seen Samuel Stephenson taking down the gas-piping in the area. After he removed it he went into vault No. 33, where he remained about twenty minutes.

Henry Bent, avorred that he saw the letters produced, written by the prisoner Samuel. After they were written, Samuel asked him to post them to Thompson, with instructions to send them to the parties they were for.

Mr. STUBBINS said he might state at once that his case was that this very man wrote the letters himself.

Witness said that after he received the letters he kept them for a time; and he afterwards showed them to Mr. Jones, at the "Old Engine," Dale End, who read them, and witness then suggested that they should be burnt. He left them with Jones, thinking he would destroy them.

Mr. STUBBINS asked witness to write on a piece of paper "I was the sole proprietor."

Witness wrote the words; and the paper was handed to Mr. Stubbins, who compared the writing with that of the letters.

Mr. STUBBINS: Now do you swear on your oath that you did not write these two letters?

Witness: No, I did not.

Mr. STUBBINS handed the letters and the witness's writing to the Bench, and remarked that the writing was very much the same. Some of the letters were exactly the same as in the original letter. The letter S for instance in "sole" was a capital letter in the original, and also in the few words written by the witness.

Cross-examination continued: A man named Thompson had lodged with him. He did not receive £5 from the Stephensons to tell them Thompson's address. But they gave him £5 to send to Thompson to get out of the way with. He sent the money, but never had any reply.

F. W. Jones, formerly manager of the "Old Engine," in Dale End, said that Bent showed the letters in question to him, with other documents belonging to Henry Thompson, whose real name, he believed was Hayhurst. Witness kept possession of the two letters, and handed them to Mr. Llewhellin.

Cross-examined: Bent had said several times he intended getting money from the Stephensons.

Mr. YOUNG: What for?

Witness: For the documents in his possession.

Mr. STUBBINS: He said that if the Stephensons did not give him £2 or £3, he would make it hot for them?

Witness: Yes; £10 was the sum he mentioned.

Thomas Rook deposed to seeing Samuel Stephenson, on July 3, standing on a box removing some gas-piping from the area wall. He lent Samuel a pair of gas-tongs for the purpose of unscrewing the pipe. After removing the pipe, he went into No. 33 vault. Witness looked in, and saw him coming along the cellar with a bent gas-pipe, which he placed on some sugar-bags. He had at other times seen all the prisoners go into No. 33 vault.

William Green, assistant superintendent in the lamp department of the Corporation, said that on Tuesday, July 24 last year, he went to Stephenson's premises and took up the gas-piping under the floor of No. 33 vault and the area, and found it led to vault No. 2. It was a 1¼-inch wrought-iron service-pipe; and the length was 50 feet, including sockets and union. It was marked with the private mark of the Anchor Tube Company. There were two jets of gas burning in No. 2 vault; and the gas did not pass through a meter, nor did the gas used for heating the stills. Having regard to the Bunsen burners used, he had made a calculation of the quantity of gas consumed under the stills from the middle of April, 1887, to the time the discovery was made.

The STIPENDIARY thought the consumption for a month or six weeks would be sufficient.

Witness said he based his calculation on information he had to hand as to what was termed a boiling—that was the number of hours. Having cut the service and inserted a meter for the purpose of making tests to see how much gas the seventeen Bunsen burners would burn, he found that they would consume 799 cubic feet per hour, and give a very great heat. He continued his test for five hours. Adding to the consumption of the Bunsen burners the gas burnt for lighting purposes, he found the total consumption was 826 cubic feet per hour. He calculated that gas was consumed 96 hours a week.

The MAGISTRATES' CLERK (Mr. Barradale) said the prosecution charged the prisoners with stealing a specific quantity of gas. Could they go beyond the dates when it was consumed?

Mr. YOUNG said his case was that the theft was continuous from April, 1887.

Witness further said that, assuming the operations were going on from about the middle of April, 1887, to the 29th of July, 1888, ninety-six hours a week, the amount of gas consumed would be 5,490,000 cubic feet; and its value at the lowest selling price charged would be £617 12s. 6d.

The STIPENDIARY said he considered a *primâ facie* case was made out against all the prisoners; and they would be committed for trial at the Quarter Sessions.

The case occupied the Court about six hours.

BIRMINGHAM CORPORATION WATER SUPPLY.—In consequence of the sources from which the Birmingham water supply is obtained having proved somewhat inadequate to meet the requirements of the city and suburbs, especially in dry weather, a number of men have for some weeks past been engaged in boring operations, with a view to securing an additional source of supply. A depth of rather more than 200 feet has been reached.

THE LEEDS GAS COAL CONTRACTS.—The tenders for the supply of gas coal to the Leeds Corporation were again considered by the Gas Committee at a meeting held last Thursday afternoon—Mr. Gilston (Chairman) presiding—and it was decided to accept tenders for the supply of 60,000 tons, at prices showing an average advance of 2s. per ton, as compared with last year's quotations. Tenders for the supply of about 160,000 tons were accepted in the previous week, showing an average advance of 1s. 6d. per ton.

THE DANGERS OF ELECTRIC LIGHT PLANT.—An inquest was held at Woolwich last Thursday on John Conolly, who was killed by an electric shock at Siemens's Telegraph Works, Charlton. He had been a telegraphist in the Royal Engineers; and a month ago obtained work at Siemens's, and was ordered to mind an engine in the electric-light room. It is said that, out of curiosity, he touched one of Sir William Thomson's volt meters used in the room for measuring the pressure of a dynamo. The moment he did so he fell dead on the floor; the electricity passed in at his left hand, coming out at the right, and leaving two holes in each hand. A verdict of "Accidental death" was returned.

NEW ELECTRIC LIGHT UNDERTAKINGS.—During the past week the Crompton Electric Supply Company of Australia, Limited, was registered with a capital of £50,000, in £5 shares, "to carry on in the Australasian colonies the business of contractors for the supply of electricity, and for the execution of all work connected therewith;" and the Wolverhampton Electric Light and Power Company, Limited, with a similar capital, in £10 shares, "to establish and carry on in Wolverhampton, or within 10 miles thereof, works for the purpose of the production, transmission, storeage, and use, by any means and for any purpose, of light, heat, electric, magnetic, or other force, and to supply to corporations, companies, firms, persons, or municipal bodies or authorities of any kind, light, heat, or force upon such terms as the Board may at any time think fit."

BURSTING OF A WATER-MAIN AT BIRMINGHAM.—Last Sunday week, about seven o'clock, great alarm was occasioned among the residents of Aston New Town, Birmingham, by the bursting of one of the Corporation water-mains, 2 ft. 6 in. in diameter. It gave way at the corner of High Street and Whitehead Street; an immense hole being excavated by the water, which poured through in a huge column with such force as to be carried over several adjoining houses 60 feet high—the back portion of a row of houses in the rear being wrecked. The adjacent streets and houses were flooded; and several persons had narrow escapes of losing their lives. An hour elapsed before the caretaker at the reservoir could be communicated with, and the water turned off. The fracture in the main extended along the entire length between two joints; and when people could approach, they saw that the towering jet of water had made for itself a passage through the ground some 15 feet long by nearly 12 feet wide.

THE LLIW RESERVOIR OF THE SWANSEA CORPORATION.—The Water-Works Engineer of the Swansea Corporation (Mr. R. Wyrill) has prepared schemes for the restoration of their storeage reservoir on the Lower Lliw, which is now useless, by the reconstruction of a new water-tight dam. It may be remembered that this reservoir was made about 20 years ago, from designs by Sir R. Rawlinson. It consisted of a wall of puddled clay stretched across the width of the Lower Lliw Valley, and supported in its place by sloping embankments of earth and stone. The work was carried out in what was considered to be the most substantial manner; but owing to the occurrence of a leak beneath the dam, the embankment subsided to such an extent as to render the reservoir useless. Of the two plans prepared by Mr. Wyrill, one provides for a puddle wall, as at present, to be placed inside the old bank; the other contemplates a stone wall on the same site. The former is estimated to cost between £80,000 and £90,000; the latter, which embraces some novel features of construction, between £90,000 and £100,000.

CASTLE DONINGTON WATER SUPPLY.—On Monday last week, at the meeting of the Shardlow Rural Sanitary Authority, a discussion took place on the application by the Committee at Castle Donington for the Authority to arrange with the Long Eaton Local Board to supply Castle Donington with water. Dr. Harwood reported that he had tested samples from 45 wells, and 23 were good for drinking, 10 were contaminated to an appreciable extent, and 12 were unfit for use. Some of the wells might be remedied; but in all probability they would get bad again. It appeared that at a meeting of the Castle Donington Parochial Committee in the previous week, it was agreed to ask the Authority to proceed with the scheme, though six members of the Committee were for, and five were against such a course. After a full discussion, the resolution of the Committee was confirmed. An inquiry will now be held at Castle Donington by an Inspector from the Local Government Board; the Authority requiring to borrow £2000. Consequently, those opposed to the scheme will have an opportunity of having their views heard again.

THE COMPETITION OF OIL WITH GAS AT BANGOR.—Owing to the steady reduction in the consumption of gas at Bangor in consequence of the use of oil as an illuminant, the Corporation have determined, as from to-day, to lower the price of gas as follows:—When used for lighting, 3s. 6d. per 1000 cubic feet; manufacturing or trade purposes, 3s. per 1000 cubic feet cooking or heating, 2s. 6d. per 1000 cubic feet. If at these reduced rates, the consumption is not increased, a loss of about £1200 per annum will be incurred, which will have to be provided for out of the general district rate. The step taken by the Corporation was the alternative of two courses open to them in their difficulty—viz., an increase of the price to 6s., with a possible further loss of revenue; or a reduction, with a probable increase. They have chosen the latter. It now remains for the ratepayers to second the efforts of the Corporation to make their gas undertaking financially successful; and this they can well do by abandoning oil and making a more liberal use of gas, the necessary pipes and fittings for which the Corporation are prepared to supply at cost price, taking payment by instalments, if application is made before the end of the present year. The gas-works have been acquired, at a heavy cost, in the interests of the ratepayers, who will have to maintain them, either by making them pay their way as a commercial concern, or by means of a direct rate. They are the best judges as to which mode they will select